COMMODORE 64 MEGABASIC—SPECIAL OFFER INSIDE

YOUR 64

JUNE 1985

95p No.10



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MEGAGAME

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EXAM FEVER

20 QUESTIONS

Revision Made Easy

TRICKS 'N' TACTICS

PITSTOP II

Grand Prix Thrills And Spills

PROGRAMMING

PROTECT AND SURVIVE

Join The Protection Racket

Y64 MENU

MEGAGA





PROGRAMMING

PROTECT & SURVIVE

Protecting a listing from prying eyes can often be more trouble than it's worth. But if you've got something to hide, keep it well hidden — with a little bit of crafty code to beat the cheats. Read on ...

PAGE 27

READER'S OFFERS

GAMES!



COMPETITIONS

OFFERS

ROUTINE STUFF

OPEN ACCESS

CORE MATERIAL

Cover illustration by Michael Brownlow

01-631 1433

EDITORIAL ENQUIRIES
Roger Munford
PUBLISHING ENQUIRIES
Stephen England
ADVERTISEMENT ENQUIRIES
Alan Towler, Penny Rouch

01-636 3513

Y64 HELPLINE
Martin McGuiness
(**Y64** Helpline enquiries between 10am-1pm and 2-5pm, Tuesdays and Thursdays **only**!)
Your 64, Sportscene Specialist Press, 14 Rathbone Place, London W1P 1DE.

OPEN ACCESS

If you want to know what Ariolasoft, Virgin Games, Rumbelows, Micro Computer International, SMC, Compunet, Anirog Software and Commodore are up to ... read on!



All aboard for Mirrorsoft's *Spitfire 40* simulation. Chocks away!

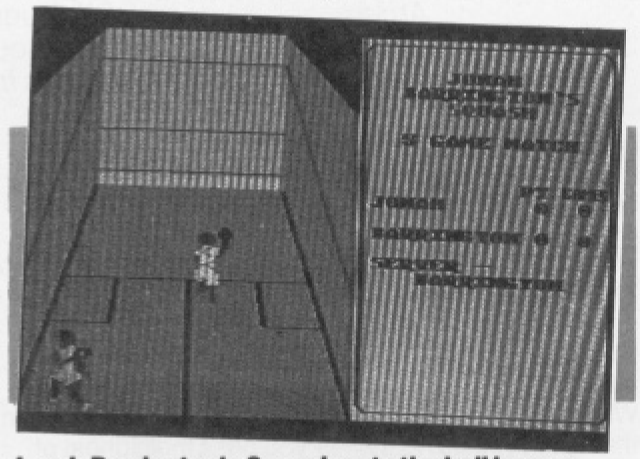
Roger 'n' Out, Biggles!

Think of it . . . you're a Spitfire pilot in the summer of 1940 and you're about to undergo flight training in Britain's most famous fighter plane! Welcome to Mirrorsoft's *Spitfire 40* . .

First off, you've got to learn how to control the Spitfire in practice mode — then, as you progress, you'll move on to practice combat and ultimately to combat level. All combat and practice experience can be saved to your flight log enabling you to rise to the coveted position of Group Captain, DSO, DFC, VC.

Mirrorsoft is also running a competition in which dedicated players, who've reached the rank of Group Captain, will be included in three prize draws for a fabulous day in the Battle of Britain Museum.

Spitfire 40 comes complete with a flight manual, quick reference and keyboard guide, and is available for the 64 on both disk and cassette at £12.95 and £9.95, respectively. Potential pilots should get in touch with Pat Bitten on 01-822 3947.



***Jonah Barrington's Squash* puts the ball in your court!**

What A Racket!

New Generation Software has just launched *Jonah Barrington's Squash* for the Commodore 64. This simulation squash game was developed under the beady eye of Jonah Barrington (former World Squash Champion) and is said to sport superb animation and 3D effects.

Programmer Malcolm Evans has also incorporated a new concept called Reprosound (*Whatever that is. Ed.*) which Malcolm claims will make the game even more realistic.

Jonah Barrington's Squash is priced at £7.95 on cassette, further information can be squeezed out of Rod Evans on (0225) 316924.



Have A Ball!

At last! A tracker ball that's claimed to actually stand up to constant use . . .

The Marconi RB2 tracker ball has finally been launched for the 64 and looks destined for the big-time. And it's priced that way too — £59.95

Developed for serious hobbyists, educational establishments and users of graphics packages, Marconi claims the RB2 is the most stable and accurate joystick on the market.

Dial Marconi on (0582) 64334 if you're having trouble tracking the RB2 down!

Good Connections?

Here's a few details about a parallel Centronics interface from Zero Electronics. Connected up to the 64's serial port, the Zero interface is compatible with all existing software. And the good news is that the interface can also be connected to a daisy wheel printer or graphics printer.

We're assured that the price has been kept down to £42.95 because of the use of a custom chip, but there's also the option of a 16K buffer that means waiting between printouts will become a thing of the past.

You want to hear more? Get in touch with Pete Griffiths on (0493) 842023.



Dear Diary . . .

The Secret Diary of Adrian Mole: 30th May 1985, pm; Nigel will be really jealous when I tell him Mosaic Publishing is soon to release a new computer game about me. The company's going to put my secret diaries on a computer; I just hope they censor the bits about the steamy scenes I had with Pandora or she'll kick me in the goolies! She says she won't be labelled a 'scarlet' woman by Allun Sundry (goodness knows who he is).

Mother says she's glad it's a text adventure as she thinks kids these days are getting too engrossed in nuking the Ruskies (which I thought was really helping East-West relations).

I've been told by Mosaic's Joe Lang that the game should be out in the Autumn — but thats all I'm allowed to say. If I get too anxious, I'll be ringing him on 01-228 4463 ... how about you, dear diary?

ARCADE ACE

Arcade ace takes on BC's Quest For Tyres, Ghostbusters *and* Henry's House ... *with a little bit of help from his friends!*

Back again with a whole bunch of tricks 'n' tips for all you joystick junkies . . .

And first off, we'll start with Software Projects' *BC's Quest For Tyres,* especially as I've got some advice from **Stephen O'Connor** of West Lothian. He tells me that when you get to the river, the best thing to do is wait for cavewoman to drop her club for the fourth time and then go for it. He also suggests that you go to the far left of the screen before you start your journey across the turtles.

That's all well and good, Stephen, but if you jump the first three turtles when you first get to the river, wait, and then jump the last tultle, it's a lot quicker!

Moving swiftly on to Activision's *Ghostbusters,* I've had quite a few suggestions as to how to beat it. But by far the most salubrious is the one from **D Thomas** of Cumbria, who's found an ingenious way of trapping the ghosts. All you have to do is manoeuver both ghostbusters to the far left of the screen, until they're in exactly the same place, and then fire the streams and set off the trap. You'll find that no matter where the ghost is on the screen, it'll be caught.

And before we move away from *Ghostbusters,* why not try a tip from **Joseph Rossi** of Swindon. Apparently if you type your name, 'yes' to the account, and insert '26543' as the account number, it could be useful!

Moving on to a game I'm really into at the moment, English Software's *Henry's House,* I've a few suggestions for those of you, like me, who've had a problem with levels three to six. I've dealt with levels three and four in the screen shots given, but for levels five and six, read on!

Level five is fairly easy really — all you have to do is collect all the objects at the top and drop off the right-hand side of the screen, making sure you press the fire button when you pass the highest of the tower blocks so that you parachute to safety.

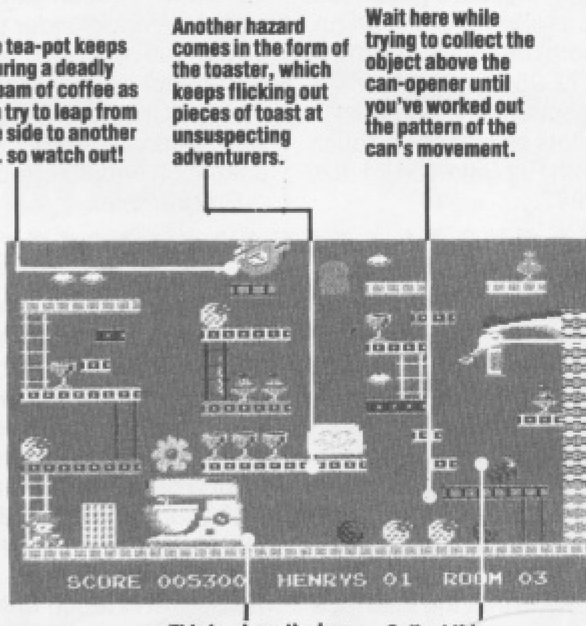
To complete level six you've first got to collect the objects on the left and go to the right to get the objects on the ladders. You've now got to grab the telephone from the top left of the screen, and for that you'll have to use very fine control of the joystick. You'll have quite a few close calls, so make sure you have a joystick that allows you to move extremely short distances at a time.

And that's all from me this month . . . but remember, if you've got any tricks 'n' tactics you want to share or you can't beat a particular screen on any game, write to me, Arcade Ace, at *Your 64,* 14 Rathbone Place, London W1P 1DE. Let's be hearing from you!

The tea-pot keeps pouring a deadly stream of coffee as you try to leap from one side to another . . . so watch out!

Another hazard comes in the form of the toaster, which keeps flicking out pieces of toast at unsuspecting adventurers.

Wait here while trying to collect the object above the can-opener until you've worked out the pattern of the can's movement.



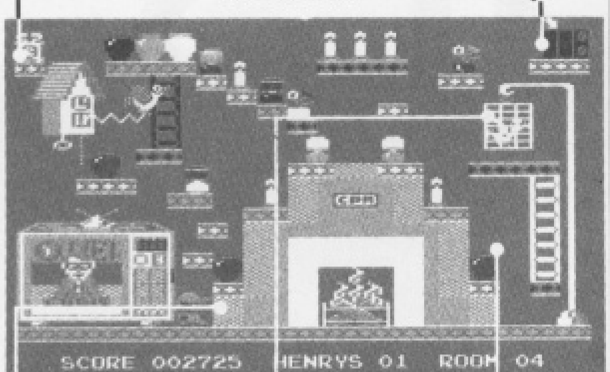
Once you've collected all the objects on the left-hand side of the screen , move here to activate the alarm clock to set the bird free.

This is where the key appears once you've collected the strawberry.

Collect this strawberry and the key will appear on the lower level.

The can-opener itself is harmless to Henry, but watch out for the can!

This is where you'll exit the screen if you manage to keep out of harm's way.



This is where you enter the screen — as you can see there's no way through to the right-hand side of the screen until you free the bird from its cage.

Once the alarm clock's been activated, the bird will move across the screen at varying levels. Keep out of its way or it'll be curtains!

When you've set the bird free, collect all the objects on this side of the screen . . . and you're home free!

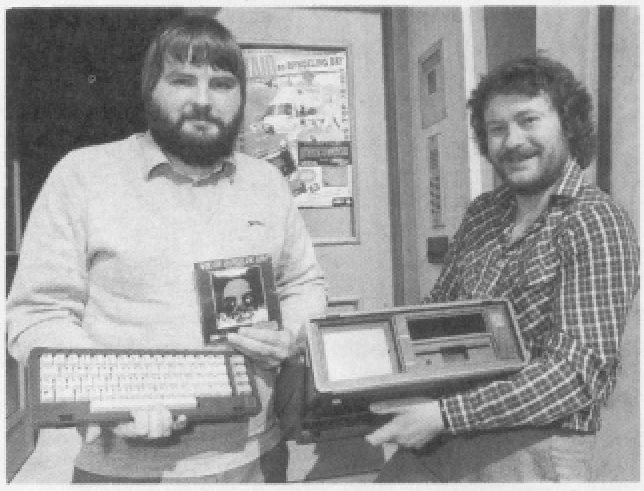
It's A First!

Two new companies — namely First Publishing and First Software have been set up to put serious, high-quality business software and books within the reach of Commodore 64 owners.

The companies have published a range of seven books and five disk-based software packages including an Assembler/Monitor at £19.99 and First WORD 64 word processor at £35.99, and all software will come with a large ring-bound instruction book.

Managing Director, Sara Galbraith told us "We aim to fill the gap between cheap software that isn't good enough and business software that's just too expensive." Sounds reasonable . . .

If you want to find out if they can fulfill their claim, contact Peter Jones on 01-580 8418/9.



Software Super-Savers

The *Y64* 'super-hype' award this month goes to Ariolasoft, who's giving away £10,000 worth of goodies over the next few months. All you need to do is to get hold of any new Ariolasoft title and send the enclosed coupon off to the company and, who knows, you could be like Paul Cliff from Sharpness and walk away with an SX64.

Each Ariolasoft title also contains a special discount voucher — and if you collect them you start saving money: three vouchers will get you £5 off a Boss joystick; five vouchers saves you £10 on a Currah speech synthesiser; and, if you can wait long enough to get 10 vouchers, you'll save £50 on a Commodore 1541 disk drive!

Contact the 'money-off' king at Ariolasoft, Nick Thomas, on 01-222 0833, for further information.



This happy group of people are the Haley Family. And the reason they're so happy is that they've just won a two-week holiday in Florida and £2,500 simply because they managed to place in the correct order seven features of the C16. And why didn't Commodore and Spectrum groups PLC choose to base the competition around the 64? Well, rumour has it that the judges found so many fine features of the CBM 64 that the chances were no-one would have been able to put them in order! Seven features are fine... but 77!!

OFF THE HOOK



If you've got a problem on the Commodore 64, don't bottle out. . . ring Martin McGuinness *on the* Y64 *Helpline.*

The phones haven't stopped ringing over the past month! I was kept on my toes each *Y64* Helpline day — but some of you still insist on ringing on the other days as well. It's great to hear from you all and I'm happy to try and answer all of your questions, but please limit your queries to Tuesdays and Thursdays only!

And now let's get down to business. A number of callers seem to be having a frustrating time getting their games software to load. Well I'm not one to defend software manufacturers, but I doubt it's the fault of the game itself. . . more likely, the problem's with your datasette. Commodore's cassette decks are of very high standard, but there are a few on the market that seem to have difficulty with programs that load at 300 baud. And, of course, now the games market's inundated with all sorts of 'go-faster' loaders between 300 and 3000 baud, the Commodore (and, indeed, quite a few other) tape decks are feeling the strain. The solution? Well, there isn't really one as such, but it's worth checking out Interceptor Micro's *Azimuth Head Alignment* package. For your £8.99 you'll get all the gubbins you need to set your tape recorder up for perfect loading; there's even a free game thrown in as a bonus.

Back to the *Y64* Helpline, I had a very panicky Stephen Keeney on the line, begging me to tell him how to get through the hole in the adventure *Monroe Manor.* Well, Mr Keeney, first you've got to get hold of the candles, matches, meat and the ladder. Then type 'Go Hole' and 'Get Coin', and you're nearly there! By the way, of course I'm happy to offer advice on adventures (if I've played them, that is!) but you'd be best advised to write in to the *Y64* Adventure Helpline if you've got a major hassle on your hands. Write to the *Y64* Adventure Helpline, *Your 64,* 14 Rathbone Place, London W1P 1DE . . . and that applies to adventure 'know-it-alls' too — why keep all those secrets to yourself, send in all your adventure hints 'n' tips now.

I've had a couple of readers on-line enquiring about the *Y64* Checksum program (*Y64,* issue 7). Well, the idea is that using the Checksum program you can make sure that any listing we publish in *Your 64* can be typed into your Commodore 64 without error; any error shows up each time an incorrent line is typed in. If you'd like a photocopy of this program or a photocopy of the Checksum data for any program published in *Your 64,* please send me a stamped addressed A4 envelope and I'll do the rest.

Finally Angus Muir of Cheshire rang me with some very useful tips for *Y64* readers. He kicked off with the fact that joystick port 1 is at address 56321 and joystick port 2 is at address 56320. He then went on to give me a couple of useful POKEs, one to disable the Run/Stop-Restore (POKE 808,225) and another to enable it (POKE 808,237). Cheers, Angus!

The *Y64* Helpline is available on 01-636 3513 between the hours of 10am-1pm and 2-5pm on Tuesdays and Thursdays only!

On Safari

Fancy a break? How about a trip to the jungles, especially when Elephant Memory Systems is footing the bill. Enter the Kenya Safari Competition — by purchasing a 10-pack of Elephant floppy disks — and you're in with a chance to scoop up one of four *super* two-person safaris, first class accommodation and all expenses paid, of course. What's more, you may even get the chance to travel on a 'jumbo' jet!

Details of the compo come with each of the special packs but, if that's not good enough, chat to John Wise on (0923) 41244.



You don't have to go to Africa to buy Elephant Memory disks ... but that's where you could end up!

your 64 ADVENTURE HELPLINE

Having problems with an adventure? Don't give it another thought . . . that's what the Y64 *Adventure Helpline's all about!*

What we've got here is an opportunity for those of you going through that frustrating experience of getting stuck somewhere in an adventure program to bare all . . . and let the valient readers of *Y64* come to your aid. All you have to do is write in and tell us which program you're having traumas with, and your address or phone number so that some kind soul can contact you, and we'll do the rest!

Adventure fanatics, both frustrated and knowledgable, should complete the coupon and send it off to *Y64* Adventure Helpline, *Your 64,* 14 Rathbone Place, London W1P 1DE. Go for it!

ANY QUESTIONS?

Return To Eden
Alistair Cook, Thornfield, Stranraer DG9 YLW.

The Quest & Zork I
Mr PA Eves, 26 Ridgeway, Berkhamsted, Herts. Tel. (04427) 6319.

Eureka
Philip McCarroll, 18 Dows Road, Ballyciarn, Belfast BT8 8LX Tel. 023-126 382 (after 4.30pm).

Twin Kingdom Valley
Richard Hennis, 196 Bolton Road, Haukshaw, Near Bury, Lancashire.

ANY ANSWERS?

The Hulk
Michael Steward, 80 Stonecross Road, Hatfield AL10 0HP. Tel. (30) 72238.

Eureka
Johnathon Walond, 5 Brookside, Wellington, Hereford HR4 8AQ. Tel. (043) 271692.

Fools Gold
Mr R Bowler, 80 Middle Leasons, Woodgate Valley, Birmingham B32 15W. Tel. 021-422 9302 (after 2pm).

Empire Of Karn
Mrs Lynn Leech. Tel. (0942) 606900 (after 6.30pm).

Upper Gumtree
Matthew J Gregg, 16 Belmont Road, Smethwick, Warley, West Midlands B66 4EL. Tel. 021-429 9353 (between 5 and 9pm).

Y64 ADVENTURE HELPLINE

I'm admitting failure with/probably the No.1 expert on* ....

....

Here's my problem/tactical hint* ....

....

....

....

....

*Delete as applicable

Name ....

Address ....

....

.... Postcode ....

Phone ....

And I'll be there from .... (am/pm)

Complete this coupon (or a photocopy of same) and send it off to Y64 Adventure Helpline, *Your 64*, 14 Rathbone Place, London W1P 1DE.



The Wafadrives are dead! Long live the Quick Data Drive!

Wafa Winners

Thanks to all the readers who entered the Wafadrive competition (*Y64* issue 5). To refresh your memories, you were asked to place in order the ten attributes you'd like to see go into the making of a Rotronics Wafadrive. Rotronics were offering 25 Commodore 64 Wafadrives as prizes, but unfortunately the original peripheral was never produced. Don't despair, though, the 25 lucky winners will now receive a Quick Data Drive, just launched by Dean Electronics.

This new unit loads 15 times faster than the conventional datasette and has a built in file-management utility that allows copying to and from cassettes, disks or other Quick Data Drives. There is also a supporting range of business and games software for the new system and Wafer Cartridges cost between £2.45 and £2.99. Further information can be gleaned by contacting Shaun Tredinnick on 0344 885661.

Congratulations to the following *Y64* winners, who will shortly be receiving their Quick Data Drives:

Mr P Millsom, Harwood Park, Bromsgrove; Gert Madsen, Aasumvej 505, Denmark; C J Moore, Wallingford, Oxon; Alan Fawbert, Southport, Merseyside; Mr C F A Holmes, Mackworth, Derby; S Bennett, Mapperly, Nottingham; Mr T Martin, Seaton Burn, Newcastle Upon Tyne; Nanno Bolt, Hopstraat 19, Holland; Tom Reid, Port Seton, East Loathian; D Constable, Sharnbrook, Bedford; D Swainston, Halifax, West Yorks; N Kortenoeven, Huissen, Holland; Mr M P Green, Gainsborough, Lincolnshire; Mr D Jameson, Great Barr, Birmingham; Michael Rymer, Hackney, London; A Russel, Kettering, Northants; A J Sullivan, Forest Hill, London; Mr J O Yarker, Pickering, North Yorks; Steven Higgs, Hazelmere, Bucks; J J Freestone, Redhill, Surrey; John Wheatler, Oldham, Lancs; W J Lawrence, Gleneagle Road, London; William Faulks, Kirkaldy, Fife; David Clasper, Thurso Caithness; R Palmer, Burton Manor Road, Stafford.

Comal At Last!

By the time you're reading this, the long awaited Comal cartridge should be available in limited quantities from Commodore. The cartridge was originally set for release in January, but was held up due to chip shortages.

Including all the usual features of Comal — such as IF ... THEN ... ELSE, REPEAT ... UNTIL, procedure handling and so on — the cartridge version incorporates additional features, unique to the 64; these include screen and colour control, turtle graphics, sprite and sound control and much more.

Double Trouble?

Anirog Software has been busy of late — and it's come up with a couple of graphic adventures for the 64.

Catacombs has you crawling through caverns looking for the cure to the plague and, in complete contrast, *Las Vegas* is one of those glorified one-armed bandit affairs. Both of these sparks of originality are priced at £6.95.

Phone (0322) 92513 to find out if Anirog has anything else up it's sleeve.

Into The Music?

Our mole in Virgin Games tells us that its team of 'live wires' is busy 'touching up' the new games for release in April and May.

Alongside *Gates of Dawn* — a trip into dreamland, in which you take part in a graphic adventure that's got to finish by dawn — there's also a re-write of the Spectrum favourite, *Strangeloop*.

Very much in the making is *Ghettoblaster*, a game written initially by the team that put together *Seaside Special*. The action involves a Rasta 'hip-hopping' around with a portable stereo taking cassettes from one location to another; all the streets are named after songs, such as *'Moonlight Drive'*, *'Positively Fourth Street'* and *'Hold Me Close'*. All you have to do is blast your music at the passers-by, but keeping an eye out for the 'tone-deaf's, policeman and the 'Psycho Killers'.

Strangeloop and *Gates of Dawn* are both priced at £8.99, but if you want to hassle Virgin about *Ghettoblaster*, then give 'em a buzz on 01-729 8070.



Virgin's *Gates Of Dawn* — and there's some goodies to be won on page 19. Go for it!

HARD LINES

Bookshelf bargains? Check 'em out with Chris Palmer ...

Haven't we all fancied having a crack at the big time? You know, walking out on stage at the Hammersmith Odeon, posing casually in front of thousands of screaming fans. Experiencing the thrill as you crank the SID chip up to brain-curdling volume and letting fly with a gut-shattering riff.

As you've probably realised, under the calm exterior of the 64 is what amounts to a very powerful synthesiser straining at the leash. And, the book world is there as ever to help you make the most of it.

First off is a brace of titles from those awfully nice Sunshine people. *Commodore 64 Music* (ISBN 0-946408-78-5, £6.95) takes the classic approach, starting with a couple of chapters explaining sound and music ... which will hold you in good stead next time you're watching *Top of the Pops!* The main bulk of the book, however, examines each section of the SID chip, detailing how the different sections go together to make up a sound, with notes on how to write and store tunes. You'll also find a program that'll enable your 64 to write its own tunes.

Moving right along, there's *Electronic Music on the Commodore 64* (ISBN 0-946408-59-9, £6.95) by Mark Jenkins (of *Melody Maker* fame). The first part of the text deals with the SID chip's ability to produce sounds, while the second section concentrates on how the 64 can be used to control other musical instruments; this centres around the Musical Digital Interface (MIDI to you lot) standard.

There's also a chapter on how to wire your 64 up to a Hi-Fi amplifier which not only makes your music more meaningful ... but can turn arcade games into something altogether devastating!

You're probably wondering how I've managed to get through two books without being nasty. The answer, of course, is that I'm saving all my literary venom for the last offering, Addison-Wesley's *Creative Sound and Graphics on your Commodore 64* (ISBN 01-201-14330-1, £6.95). The text labours through old favourites such as defining UDGs and sprites, but the sound element is covered with a few standard sound effects routines! Definitely not recommended for serious musicians of the fame- and fortune-seeking kind!

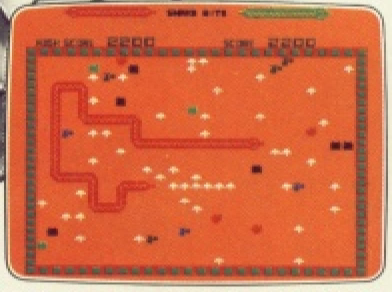
And that's it from me ... I'll just tune up the 64, leap in the limo and head off for the bright lights. Thank you and goodnight.

Service With A Smile?

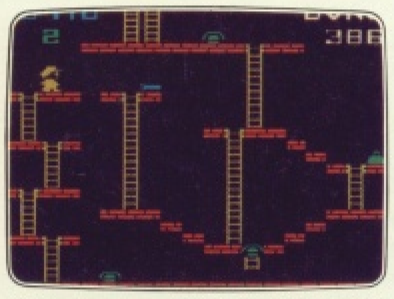
What do you do with a broken 64? Well, if you live near the Greenford/Ealing area, why not pop along to Rumbelow's 'Service Clinic' at unit F, Greenford Industrial Estate, Fieldway, Greenford (just off Western Avenue). You don't have to be a regular customer to use the clinic — and Rumbelows claims it to be "the most efficient, sophisticated and convenient on offer to the public".

Find out for yourself by ringing The Service Clinic on 01-575 7400.

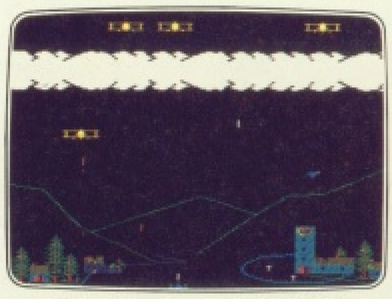
SILVER RANGE Seeing



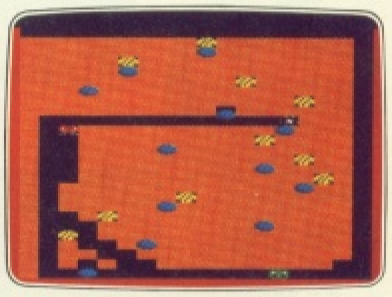
001 Arcade VIC 20 (UNEXPANDED)
SNAKE BITE – Simply the slitheriest game of its kind.



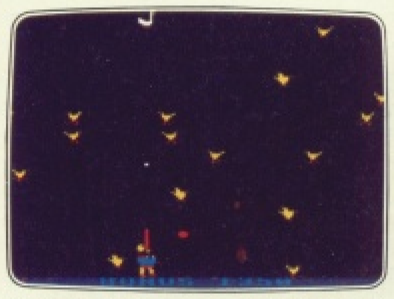
002 Arcade VIC 20 (UNEXPANDED)
MICKEY THE BRICKY – Four screens packed with fun.



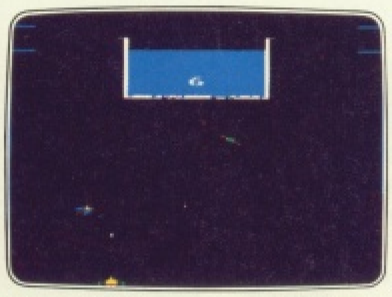
003 Arcade BBC MICRO B
BIRD STRIKE – Wing the planes and shoot the pigeons.



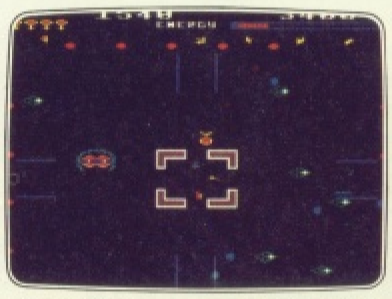
004 Arcade BBC MICRO B
GOLD DIGGER – The hazards of digging for gold down under.



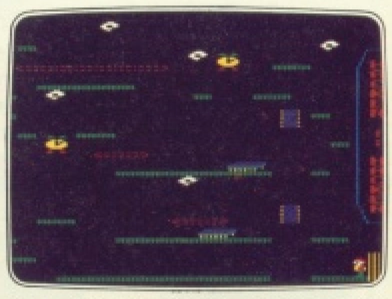
005 Arcade BBC MICRO B
DUCK! – Comedy and music in this duck shoot.



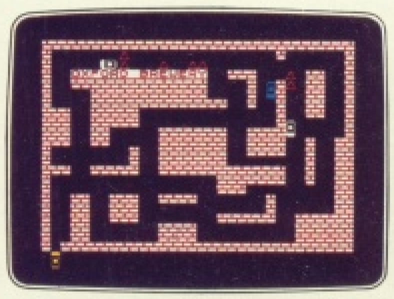
013 Arcade BBC MICRO B
ACID DROPS – Fly through to tackle the mutant spinners.



022 Arcade BBC MICRO B
ESTRA – Recover the sacred statue of Estra the snake god.



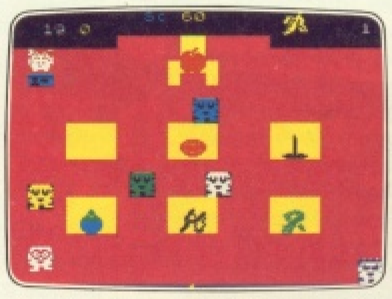
023 Arcade/Strategy BBC MICRO B
THE HACKER – Terminal to modem, telephone network to mainframe.



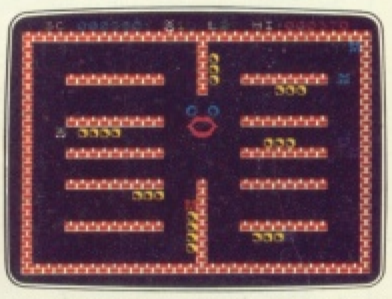
006 Arcade SPECTRUM 16K/48K
RUN BABY RUN – Multi-car cop chase and shoot-out.



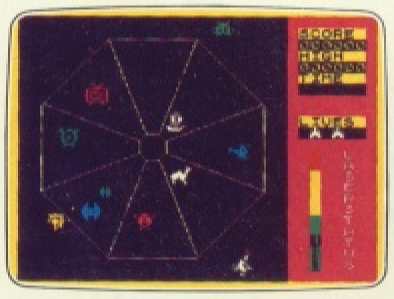
009 Arcade SPECTRUM 16K/48K
TERRA FORCE – Terra man defends earth against all odds.



010 Arcade SPECTRUM 16K/48K
MENACE – What happens when teacher turns his back.



021 Arcade SPECTRUM 16K/48K
CRAZY CAVERNS – Ten crazy caverns, ten hungry mouths to feed.



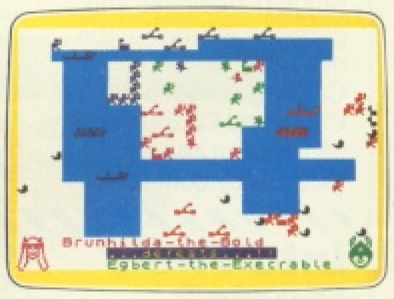
007 Arcade SPECTRUM 48K
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Bin It!

If you haven't already had enough of the Thames Television quiz show *3-2-1*, there's now a 64 version of the game

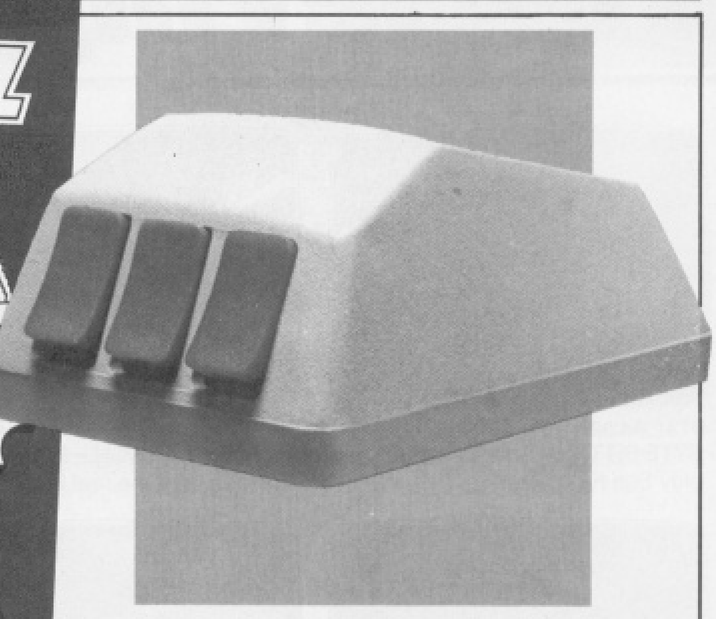
Micro Computer International is the company responsible and it's making *3-2-1* available by mail order only. There's the usual display of 'things to be won', but there's a Star prize of one week's holiday for two in sunny Spain. Other prizes include Fidelity colour TV sets, Raleigh bicycles, food processors, Microvitec monitors, Trojan light pens, Cheetah peripherals and software by Virgin and New Generation.

There's also the chance to win the booby prize — yes, you've guessed it — a Bendys Toy's *Dusty Bin*

For further information contact Paul Duffy on 01-904 1735.



3-2-1 gives you the chance to win a Spanish holiday, colour TVs, printers and interfaces and — would you believe — bicycles and food mixers!



SMC's Mouse should make you 'paws' for thought.

Mouse Trap?

SMC has released the Mouse — a peripheral that'll help more artistic 64 owners get the most out of their machine.

Priced at £59.95, the Mouse isn't cheap... but you do get a vast array of facilities thrown-in, including a choice of 16 colours, various brush shapes, air brush, fine point and many others. There's also a variable size test and panic button for those who get into a mess.

Find out more about the Mouse from David Crossweller on 01 402 9134.

COMPUNET CORNER

Make the most of the Your 64 pages on Compunet with Surya. Read all about it!

For the unitiated, here's a brief run-down on how to set yourself up to gain access to Compunet. First up, you'll have to shell out £18 for a rectangular British Telecom socket. Then you'll need to get yourself a Commodore Communications Modem — that's available from Commodore (0536 205252) for £99.95, but included in that price is your first year's subscription to Compunet.

With your 64 turned off, now insert the modem plug into the cartridge socket and plug the modem lead into the telephone socket. Now switch the 64 on and you should be greeted with a white sign-on screen, complete with the 'Compunet Ver 1.0' message; if you get the normal blue start-up screen, switch off and start again.

You're ready now to follow the logging-on instructions given in the Compunet manual. Once done, select 'GOTO' from the duckshoot at the bottom of the screen and press the Return key. Now enter 'GOTO 109277' and you'll be whisked away to the *Y64* pages of Compunet.

As Compunet news this month is a bit thin on the ground, we're going to be looking at some of the letters you've sent us on the system . . . and it's great to hear from you. We may not have time to answer all your letters personally on Compunet but, rest assured, we'll do our best to publish the best ones either here or in Missives — so keep 'em coming! In the meantime, if you do have an urgent technical problem, ring us on the *Y64* Helpline on Tuesdays and Thursdays between 10am-1pm and 2-5pm on 01-636 3513.

And without further delay, over to your letters.

I've been trying to get some help regarding the use of a Shinwa CP80 printer and trippler interface with the Compunet system and the Commodore Modem. Where would you suggest I start looking for an expert in this area?
John O'Brian (JOB4)

The best advice we can give you is to ring the Commodore Information Service on (0536) 205252 — they're really very helpful. Of course, if some of our friendly *Y64* terminal junkies can come up with an answer for you . . . Surya.

Can you tell me how I can go about loading data recorded on a Psion Organiser into my Commodore 64? What I'd really like to do is load the data on to a program such as Superbase for subsequent processing and printing out.
Steve (SGN1)

What you really need to get is a good communications program, an RS232 interface and a Psion RS232 cable. Your first step should be to buy the Psion cable and then go to a respectable Commodore dealer, and get them to demonstrate the best combination to go with it. Surya.

I've just been leafing through the latest issue (*Y64*, issue 8) and seen your plea for ideas on things to do with Compunet.

Well, I'd like to say a few things about MUD (Multi-User Dungeons) — a fully interactive adventure game. It's a great game, but in the short time I've been playing I've seen many a player accumulate (expensive) points only to die at the hand of a 'rogue' wizard who thinks it's fun (?) to kill a lower-ranked person. Why don't Compunet change the game rules so that once you've achieved a reasonable score, no idiot can crush you on an idle whim. And, yes, it's happened to me!

Also, could you help me (and others, I'm sure) by telling me all the access numbers for the public database.
David McIntosh (DWMI58)

Send us an SAE, David, and we'll post off a list of bulletin boards to you asap. Has anyone else come a cropper in MUD . . . let's hear from you. Surya.

Can you help me? I'm trying to find a program that will transform my 64 into a terminal. The program should allow me to change its duplex and baud rates on-line, as well as clear the screen when the cursor goes to the top of the screen and doesn't scroll.

I accessed the program you put up on the *Y64* pages on Compunet, and it's very good. It's just that I now find I need these extra facilities.
Brian

Well, Brian, your best bet is to contact Chris Townsend Computers on (0484) 516266 — the company sport a wealth of communications software, and you might just find what you're looking for. Surya.

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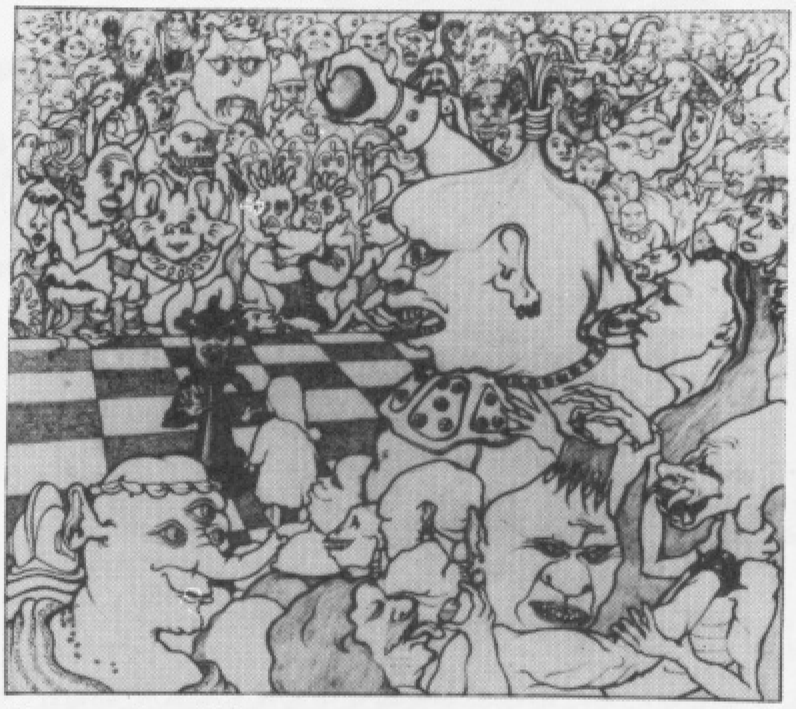
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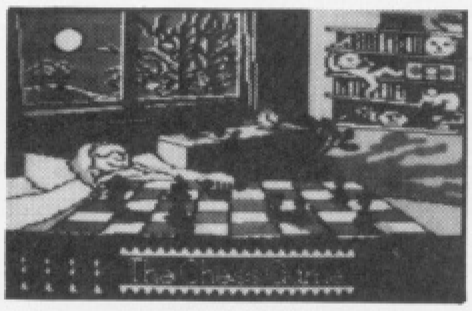
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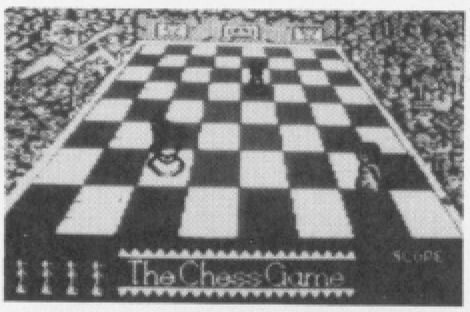
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Tip From The Top

After reading the letter from Toby Hughes (*Y64*, issue 9) I just had to send you some games tips of my own. So here goes . . .

Ghostbusters: The Run/Stop key pauses the game. This is quite useful when the Marshmallow man appears. You can also freeze the action until you're ready with the 'B' key to drop the bait and then restart the action by pressing Run/Stop again.

Summer Games: For a high score on the platform diving, push the joystick to the right — this will put you into a fast spin. Then, just as you're about to hit the water, push it forward to straighten the diver out.

Daley Thompson's Decathlon: The game can be played using the keyboard by pressing CTRL and '2' keys for running, and the Space bar for jumping or throwing. This saves considerable wear and tear on the joystick to say the least.

Pole Position: When you're on the straight parts of the track, place your car in the centre of the road with your right wheels just over the centre lines. In this position you can avoid cars on both sides of the road.

What do you think of that lot?

Paul Hazell, Maidenhead, Berkshire

Great stuff, Paul! Let's have some more of those hints 'n' tips. And if you're into games tactics, check out Arcade Ace in Open Access and the Y64 Adventure Helpline for adventure strategies. Go for it! Ed.

Bear Essentials

I read the letter from David Smithson about the Koala Pad (*Y64*, issue 4) with interest, especially when he mentioned all the new accessories available. I quite recently bought a Koala Pad myself, but these items were not included because, I was told, they hadn't been created yet. Could you tell me if it's possible to buy the extra bits separately and, if so, where can I obtain them?

Tim Wyatt, London

I've been in touch with Audiogenic about this and, although the company's no longer distributing Koala Pads and so on, it's certainly selling the software. For a full list of accessories available, contact Audiogenic on (0734) 664646. Next please . . . Ed.

For The Record

Help! I've just got my CBM 64. Fab! Brill! But my Dad is a self-employed mechanic and wants to use it for service records of customer's vehicles, accounts and financial status, and general information. But alas, I've heard that the 1541 disk drive is a terrible peripheral and is much too slow and unreliable. Please could you advise me on whether I should get him to buy a disk drive. Also, do you know of any software that's available for this sort of work.

Robert Sutton, Farnham, Surrey

Your father may well find it useful to have a disk drive if he's going to want to save a lot of data and access information quickly. Regarding software available for this type of work; Supersoft's Busicalc 1 is a spreadsheet which is ideal for small companies and costs £19.95. For a database I'd go for Superbase 64 by Precision Software, priced at £99.95. Ed.

```
50000 OPEN1,4:BA=8192:FORX1=0TO24
50010 FORX2=0TO312STEP8:C=X1*320+X2+BA
50020 FORX3=0TO6:A(X3)=PEEK(C+X3):NEXT
50030 E=0:FORB=0TO7:FORC=0TO6
50040 IFA(C)AND2↑BTHEND=D+2↑C
50050 NEXT:D(E)=D:E=E+1:D=0:NEXT:A$=""
50060 FORB=6TO0STEP-1
50070 A$=A$+CHR$(128+D(B))
50080 NEXT:PRINT#1,CHR$(8)A$;:NEXT
50090 PRINT#1:NEXT:PRINT#1:CLOSE1:END
```

This routine from Michael Carroll dumps Hi-res graphics to the MPS801.

What A Dump!

In reply to the letter from Mr Souton (*Y64*, issue 8) about dumping Hi-res graphics to the MPS801, I've written a routine that'll dump graphics pages to the printer. Unfortunately, the program isn't all that fast and a small amount of the actual display is lost when converting from character memory (eight by eight bits) to the MPS801 UDG mode (seven by six bits). However, the program *does* work and I think you'll find the results are perfectly acceptable.

Michael Carroll, Wexford, Ireland

Power Play

It's occured to me that although there's a facility on the 64 to find any power of any number, there's nothing to help you find the Nth root of any number, which could have equally useful applications. Despite extensive searching through books, magazines and manuals, I've yet to find any reference to this utility, so I wrote my own.

This short Basic program calculates any root much quicker than the built in facility *and* finds the power of a number.

WH Lovelock, Bangor

```
63100 REM NTH ROOT
63101 PRINTCHR$(147)
63105 INPUT"ORIGINAL NUMBER":X
63110 INPUT"INPUT ROOT REQUIRED":R
63112 PRINT"";R;"TH ROOT OF ";X;" = ";Y
63120 GETBAR$:IFBAR$<>CHR$(32)GOTO63120
63125 IFBAR$=CHR$(32)THENPRINTCHR$(147):GOTO63100
READY.
```

WH Lovelock's program calculates the root and power of any number you care to input.

Commodore Cover-Up

On a recent visit to the head office of my employers I had a quick look in the computer room and the first thing that caught my eye was the smoked perspex computer cover. I then decided to make a computer cover myself, and after much trial and error I came up with a smoked perspex cover which was almost as good as those sold commercially.

What about the cost I hear you say? Absolutely nothing at all! And now for the *Blue Peter* step-by-step guide to producing a fabulous computer cover!

1. Find an *old* fridge crisper box, mine was slightly too small so I obtained a blow lamp and played it around the edge until the box softened slightly (*Make sure you have an adult to help you. Ed.*).

2. Press this over the computer until it takes the shape of the machine. Care must be taken not to let the perspex become too hot or it'll stick to the computer — the best way to tell when the plastic is pliable enough is to press it with a wooden spoon until it gives a bit.

3. Cut-outs for the user ports can be made with a fine fretsaw enabling you to cover the computer without disconnection.

R Bilbie, Nottingham

Blowlamps, fretsaws . . . good grief, Blue Peter was never like this! Ed.

Check, Mate!

Your introduction of a Checksum generator (*Y64*, issue 7) is an occasion which should not go unnoticed. Any reader who's struggled with long programs must have longed for such a facility.

I'd never have coped with the Lawrence and England *Codemaster* if they hadn't had the foresight to include a Checksum generation in their book *C64 Machine Code Master.*

Since I completed the program a year ago I've often wondered why CBM 64 magazines have not provided the same facility, it doesn't take up that much room! Congratulations *Y64* for being the first to include something that is long overdue.

J Galvin, Huddersfield, West Yorks.

Trouble is, is that it does take up room . . . but that shouldn't stop you using the Checksum program. If you haven't got it and you want a copy, send in an SAE and we'll send you a copy of it for you to type in. Then, if you're having any problems with any of our listings, send us an SAE and tell us which programs you'd like the

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checksum data for and we'll do the rest. Of course, if you're writing to us for a copy of the Checksum, why not vote in the charts at the same time? Ed.

Time Warp

I'm the proud owner of an American CBM 64 and I've now got the opportunity to buy and use some of the excellent UK software available.

The trouble is that some games, *Encounter* for one, won't run on my system; needless to say, the cassette loads and runs fine on a UK system.

I've been told that the problem's related to a difference in the clock speeds and can be rectified by some POKE numbers. Any ideas?
Dave Mantei, Saudi Arabia.

Well, Mr Mantei, there are two possible television systems that you could be using with your computer. Either PAL — the British system or NTSC, the American one. By PEEKing at location 678 you can find out which system you have. If there is a zero here then you'll know your monitor is American and why it won't work when using UK software.

However, try typing, 'POKE 678,0' — this should rectify the problem. If you still cannot get it to work refer to page 150 in the Programmers Reference Guide. This section deals with raster registers — you may find register 53266 requires some changes if screen interrupts are used within the programs. Ed.

One For The Code!

I'd just like to correct one point that the dreaded 'squish board' owner (F O'Farell) raised (Missives, *Y64*, issue 8). When most of the ROM is switched to RAM, the 64 is ony 'useless' if the user is trying to use Basic. In machine code (if he knows what that is!) the machine functions perfectly, up to 60K of RAM!
The Two-Toed Sloth, Durham

Let's hear more Mr Sloth! It's not often we get readers who write in using the phrases 'machine code' and 'the machine functions perfectly' in the same sentence. But seriously, any hints and tips you've got, especially in machine code, send 'em in. C'mon 'Two-Toed' (or any other machine code magicians), there's a legion of 64 users awaiting your words of wisdom. Ed.

Driven Crazy!

I recently bought a 1541 disk drive to add to my 64 and I'm becoming increasingly frustrated waiting for commercially produced games cassettes to load . . . while my disk drive sits there switched off!

Is there any way I can transfer commercially produced software (including Turbo-load and machine code programs) from tape to disk — especially since I'm unable to break most of them! Can you advise please?
Ross Chestney, Crawley, West Sussex

And there's the rub, Ross. The only real and 'proper' advice I can give you is to buy disk versions of the games you want to play. Of course, there are ways of converting cassette-based programs to disk, but this is where we enter the realms of 'piracy paranoia'. Perhaps it's worth putting pressure on the software houses to start distributing programs on cassette and disk. What do you think? Ed.

Staff Problems?

I was very interested in the map of *Staff Of Karnath* (*Y64*, issue 9). I've been trying to finish this game for quite a while — all I'd managed to pick up was eleven of the pieces.

However, that's all changed now! I've finished the *Staff Of Karnath* once and for all! The Menhir spell worked as you correctly forecast and the message wishing me congratulations was very nice to see. And if anyone out ther still hasn't completed the game yet, keep trying I thoroughly enjoyed it.
Graham Craig, Inverness, Aberdeenshire

Thank you, Mr Graham 'Clever Clogs' Craig! Even with our map, all of us put together couldn't finish Staff.... and since your letter, the Y64 editorial office is once again crammed full of bodies trying to finish it. Oh well, nice to hear we've got a satisfied customer . . . Ed.



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LOGO COMPO

If you haven't yet seen Virgin Games' latest release *The Gates of Dawn*, the plot involves you taking on the persona of a knight in shining armour and you have to solve the graphic adventure before the break of dawn. And if that sounds like one heck of a task, you ain't seen nothing yet ...

What we've got for you here is a sort of 'spot the difference' competition ... with a difference! Look carefully at the illustration and you may see one or two Virgin Games logos in amongst the design; the Virgin Games logo is a Pac-person shape with a triangle coming in from the top. Of course, there are more than just one or two logos hidden there — but that's for you to spot.

When you think you've found all the Virgin Games logos, ring them on the illustration and complete the rest of the coupon. Then, before you pop it all into an envelope and post it off to us, write the number of logos you found on the back of the envelope. All entries should be sent off to Virgin Games Logo Compo, *Your 64*, 14 Rathbone Place, London W1P 1DE.

Prizes Galore!

Obviously we wouldn't ask you to strain the ol' brain cells too much if there wasn't a decent clutch of goodies to pick up at the end of it all. For the first five correct answers out of the Editor's voluminous hat, there'll be a Virgin Atlantic Flight Bag. But that's not all ... far from it! Inside each bag, you'll find a Virgin Atlantic Watch, a custom-built calculator, a Virgin games T-shirt, a *Gates Of Dawn* colour poster, and copies of the classic games *Falcon Patroll II, Sorcery* and *Terrorist.* Not bad eh?

And that's not all! The next 20 correct answers pulled out of the hat will each get the *Gates Of Dawn* colour poster, a Virgin Games T-shirt, and copies of *Falcon Patrol II, Sorcery* and *Terrorist.*

So, there's no excuse ... send those entries in now!

Virgin Games Rules OK!

- Entries for the Virgin Games Logo Compo must be post-dated not later than June 30, 1985.
- Each entry must include a copy of the completed coupon, as well as the number of Virgin Games logos clearly marked on the back of the envelope.
- The Editor's decision is final and no correspondence will be entered into regarding the results



VIRGIN GAMES LOGO COMPO

Send this coupon off as quick as you can ... if you want a chance of getting your hands on all the Virgin Games goodies. Address all entries to Virgin Games Logo Compo, *Your 64*, 14 Rathbone Place, London W1P 1DE. And don't forget to write the number of Virgin Games logos you find in the illustration on the back of the envelope!

I managed to find ...... Virgin Games logos in the illustration.
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....

.... Postcode ....

***MAGAZINE HEALTH WARNING** You've got an important decision here ... you can either cut this magazine up and send us the coupon, or use a photocopy instead. It's up to you!*

Y64 TOP TEN CLASSICS





Hugh Binns 4-1 (level 9)
Philip Mc Carroll 2-0 (level 9)
A Irwin 2-0 (level 9)

1 (last month: 1) **INTERNATIONAL FOOTBALL** COMMODORE

2 (last month: 2) **GHOSTBUSTERS** ACTIVISION





G Hugill 940,200
A Irwin 317,100
Dave Bartos 210,600





David Freeman 713,600
Dave Bartos 430,200
Andrew Staff 130,800

3 (up from 4) **BEACH HEAD** US GOLD

4 (down from 3) **DALEY THOMPSON'S DECATHLON** OCEAN





Steve Mulholland 6,235
Kevin Cox 5,400
Joe Harrower 3,287



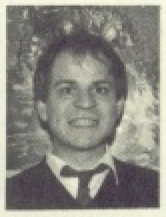


David Freeman 312,600
Adrian Terruli 281,900
Dave Bartos 210,000

5 (last month: 5) **RAID OVER MOSCOW** US GOLD

6 (up from 7) **SUMMER GAMES** QUICKSILVA/EPYX





A Irwin 7 Gold, 1 Silver
Steve Malone 7 Gold, 1 Bronze
Jerry Lewis 5 Gold, 1 Silver,





Martin Presland 20,836
Julian Dorr 8,500
Dave Baskerville 6,300

7 (up from 10) **MANIC MINER** SOFTWARE PROJECTS

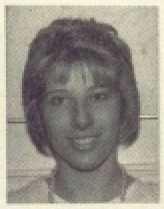
8 NEW **STAFF OF KARNATH** ULTIMATE





Gary Patterson 6.43pm Staff destroyed
Robin Cowin 6.46pm Staff destroyed
Gareth Price 7.01pm Staff destroyed





Martin Presland 40 pieces
Roger Munford 24 pieces
Teresa Maughan 16 pieces

9 (down from 8) **JET SET WILLY** SOFTWARE PROJECTS

10 (down from 6) **IMPOSSIBLE MISSION** CBS/EPYX





Matthew Judge 20,246
G Hugill 12,700
Mike Leaman 9,000

Y64 TOP TEN HOT SHOTS

Pos	Last	Title	Publisher
1	1	**BRUCE LEE**	US GOLD
2	NEW	**BOULDER DASH**	STATESOFT
3	3	**TAPPER**	US GOLD
4	NEW	**POLE POSITION**	US GOLD
5	4 (down)	**BC'S QUEST FOR TIRES**	SOFTWARE PROJECTS
6	NEW	**RAID ON BUNGELING BAY**	ARIOLASOFT
7	NEW	**SEASIDE SPECIAL**	TASK SET
8	NEW	**AQUA RACER**	BUBBLE BUS SOFTWARE
9	NEW	**ARCHON**	ARIOLASOFT
10	8 (down)	**COMBAT LEADER**	US GOLD

Want to be famous? Well, if you're a high-scoring games player keep on reading and you may become an official Y64 games consultant ...

WHODARES

WINS!

By now, you must have noticed that *Y64* sports *two* Top 10 charts — the classic Top 10 of all-time favourites, and the Top 10 Hot-Shots chart which reflects the new packages you've just bought and those you're hoping to buy.

Vote With A Photo!

If you're a red-hot top scorer, now's your chance to appear in *Y64!* So, send us your votes for your all-time faves, and when you tell us your high scores remember to send in a passport-sized black and white photo of yourself. (Don't forget to get a person over the age of 18 to witness your scores).

If you beat the resident top scorer it's *your* face that'll appear in the mag — and if you're good enough you may even rise to the esteemed position of *Y64* official games consultant. It's up to you — go for those high scores and send in your votes. Now!

YOUR 64 CHART CHALLENGE

My top five all-time favourite games are:

1. ....
2. ....
3. ....
4. ....
5. ....

My top scores are*

1. ....
2. ....
3. ....
4. ....
5. ....

** Please specify the level of difficulty.*

Independent witness*

Name ....
Address ....
....
....
Postcode ....

** Witness must be over 18.*

The next games that I'm getting hold of are:

1. ....
2. ....
3. ....
4. ....
5. ....

And this is who I am:

Name ....
Address ....
....
....
....
....
....
Postcode ....

Stick your photograph here if you are going for the High Scores Chart

Complete this coupon (or a photocopy of same) and send it to Y64 Chart Challenge, Your 64, 14 Rathbone Place, London W1P 1DE. Make sure you include a B&W passport photo of yourself if you're going for the high scores!

MAGAZINE HEALTH WARNING Using scissors on this page may impair the overall health of this magazine — please use a photocopy instead.

SOFT WARES

Save £££s off selected software titles in this exclusive offer for all Y64 readers. Go for it ...

The price of commercial games software is always on the increase ... unless you take advantage of this special offer and save yourself a fortune. Each month, we'll be listing a number of 'pocket-money specials' that'll include many of the latest and greatest games around — and you can order as many or as few as you want!

SAVE MONEY WITH Y64

Complete this coupon (or a photocopy of same) and send it off to *Y64* Soft Wares, *Your 64*, 14 Rathbone Place, London W1P 1DE. Please allow 28 days for delivery.

	Code	R.R.P.	OUR PRICE
☐ Bruce Lee (US Gold)	001	£9.95	**£8.95**
☐ Boulder Dash (Statesoft)	021	£9.95	**£8.95**
☐ Tapper (US Gold)	003	£9.95	**£8.95**
☐ Pole Position (US Gold)	001	£9.95	**£8.95**
☐ BC's Quest For Tires (Software Projects)	004	£9.95	**£8.95**
☐ Raid on Bungeling Bay (Ariolasoft)	023	£9.95	**£8.95**
☐ Seaside Special (Task Set)	024	£6.90	**£5.90**
☐ Aqua Racer (Bubble Bus Software)	025	£6.95	**£5.95**
☐ Archon (Ariolasoft)	026	£12.95	**£11.95**
☐ Combat Leader (US Gold)	008	£14.95	**£12.95**
☐ International Football (Commodore)	011	£14.99	**£12.99**
☐ Ghostbusters (Activision)	012	£10.99	**£9.99**
☐ Beach Head (US Gold)	014	£9.95	**£7.95**
☐ Daley Thompson's Decathlon (Ocean)	013	£7.90	**£6.90**
☐ Raid Over Moscow (US Gold)	015	£9.95	**£8.95**
☐ Summer Games (Quicksilva/Epyx)	017	£14.95	**£13.95**
☐ Manic Miner (Software Projects)	020	£7.95	**£6.95**
☐ Staff Of Karnath (Ultimate)	002	£9.95	**£8.95**
☐ Jet Set Willy (Software Projects)	018	£7.95	**£6.95**
☐ Impossible Mission (CBS/Epyx)	016	£8.95	**£7.95**

At these ridiculous prices, how could I resist this exclusive *Y64* offer? I've ticked the games I want to order and enclosed a cheque for £...... made out to Sportscene Specialist Press Ltd.

Please charge my Access/Visa/American Express/Mastercharge card number* ....
(*Delete as applicable)

Signature ....
(Credit card order cannot be accepted without a signature.)

Name ....
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....
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MAGAZINE HEALTH WARNING Using scissors on this page may impair the health of this magazine — please use a photocopy instead!

SCRATCHPAD

We welcome back programming Guru Jamie Clyde *for another helping of the best software hints and tips around.*

This here's the stopping-off place for all you programmers about to set out on a major project. What we've got here is a series of small routines that deal with a specific programming problem in the most efficient way. Each routine has been written to a set format — lines 20-50 call up the routine from the main part of the program, and lines 1000 on contain the routine itself.

Of course, if you've got a routine that you think would be suitable for your fellow *Y64* programmers, then send it in. Try and keep to the same style if you can, and it's worth bearing in mind that you'll not only become famous, but you'll be paid for your contribution — we pay well for published routines, but they've got to be good!

The routines given here may not look very much at first glance, but you'll soon find that you start saving those bytes. And don't forget, keep those routines coming — send them to Scratchpad, *Your 64*, 14 Rathbone Place, London W1P 1DE.

Typewriter Text

```
50 A$="HULLO! THIS IS A SIMPLE MESSAGE B
AR THAT LETS YOU ■DISPLAY MESSAGES ON"
60 A$=A$+" TITLE PAGES ETC WITHOUT TAKIN
G UP TOO MUCH OF THE SCREEN!  "
70 GOSUB1000:GOTO50
999 :
1000 REM * MAIN ROUTINE *
1005 PR$="                         ":A$=LEFT
$(PR$,10)+A$+LEFT$(PR$,10)
1010 FORT=1TO3:PRINTAB(10)"■"PR$:NEXT:P
RINT"□□"
1020 FORT=1TOLEN(A$):PRINT"□■"TAB(10)MI
D$(A$,T,20)
1025 IFMID$(A$,T,1)="■"THENGOSUB1050
1027 FORT1=1TO40:NEXTT1,T
1030 PRINT"□□□":RETURN
1060 FORG1=1TO50:NEXTG1,G:RETURN
```

Remember the way the instructions for Activision's *Ghostbusters* game were typed up on-screen? Well, here's a routine that'll do it all for you. All you have to do is place the text in the array A$ and it'll be printed up in a slow 'typewriter' style: note that the speed of the printing is controlled with the variable T1 in line 1010.

Sounding Out The Keys

```
30 R$="S":GOSUB1000:END
1000 REM * MAIN ROUTINE *
1010 PRINT"PRESS '"R$"'"
1020 GETB$:IFB$<>R$THEN1020
1030 S=54272:POKES+24,15:POKES+4,1:POKES
+4,0:POKES+4,17:POKES+1,100:POKES+5,14
1040 POKES+6,15:FORT=1TO110:NEXT:POKES+1
,0:POKES+4,0::RETURN
```

Some computers emit a sound each time you press a key, which can often be useful if you're developing an educational program. Type in this routine and you'll find that the 'S' key will beep when you press it; obviously, to make any other key make a noise, you'll have to alter R$ accordingly in line 30.

Printing Boxes

```
30 R$="S":GOSUB1000:END
50 X=10:Y=15:X$="╭─╮╰─╯|":GOSUB1000:END
999 :
1000 REM * MAIN ROUTINE *
1010 B$="":FORYT=1TOX-2:B$=B$+MID$(X$,2,
1):NEXT:PRINTLEFT$(X$,2)B$MID$(X$,2,2)
1020 FORT=1TOY:PRINTRIGHT$(X$,1)SPC(X)RI
GHT$(X$,1):NEXT
1030 B$="":FORYT=1TOX-2:B$=B$+MID$(X$,5,
1):PRINTMID$(X$,4,2)B$MID$(X$,5,2)
```

Defining boxes all over the screen can be a costly business as far as memory goes — but here's a routine that'll save you bytes. Simply enter the length and width of the box as variables X and Y in line 50, and then define the shape of the box as X$; the shapes you input to X$ should be in the form of top-left corner, top, top-right corner, bottom-left corner, bottom-right corner and the sides.

Data Type

```
30 GOTO1000
999 :
1000 REM * MAIN ROUTINE *
1005 N=10000
1010 NO=N+10:PRINT"■LINE:■"NO:FORT=1TO8
8:S$="":INPUTS$:T$=T$+","+S$:NEXT
1020 N$=STR$(N0)
1090 PRINT"■■■■"N$"■DATA"T$:PRINT"N="N$
":GOTO1010■"
1100 POKE631,13:POKE632,13:POKE198,2
```

This routine allows you to type in data in blocks of eight, starting at line 1000 (see the variable in line 1005). Note that this routine should be deleted as soon as all the data has been entered.

Flashing Text

```
50 A$="DATA CAN BE INSERTED HERE":GOSUB1
000
60 A$="AND PRINTED SMOOTHLY":GOSUB1000:E
ND
1000 REM * MAIN ROUTINE *
1010 FORT = 1TOLEN(A$):PRINT"■"MID$(A$,T,
1)::FORT1=1TO10:NEXTT1,T:PRINT:RETURN
```

This is a useful display routine that'll scroll any text entered into A$ sideways across the screen. The added bonus of this listing is that, if you put a 'RVS ON' character in the array, the next 20 letters will be flashing.

Centering Printed Text

```
50 A$=" <<<<<< PLACE YOUR TEXT HERE >>>>
>>":GOSUB1000:END
999 :
1000 REM * MAIN ROUTINE *
1010 OPEN1,4:PRINT#1,""TAB((80-LEN(A$))/
2)A$
1020 CLOSE1:RETURN
```

This routine allows you to centre any text that's entered into the array A$ (see line 50) on the printed output. An obvious note, maybe, but it's worth remembering that you'll need a printer to make this routine work properly!

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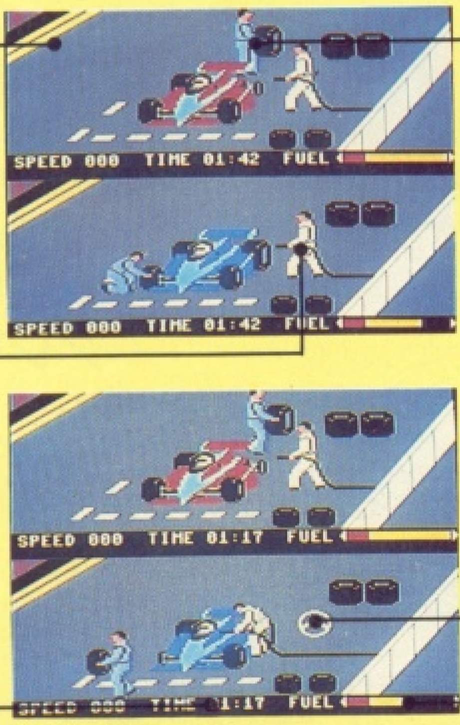
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This is you, sitting in the pits — once you've changed your tyres and re-fueled, get back on the track quick!

This mechanic is in charge of fueling the car; clever pitstoppers will find they can start the fuelling process and then move the tyre mechanic around to change the tyres — only trouble is, once the fuel tank gets filled to capacity it goes back to empty, so make sure you stop him in time or you'll have to start all over again!

Even while you're in the pits, precious time ticks away. If you want to be able to get a respectable time notched up on the scoreboard, don't spend too long in the pits!



Once you've activated this mechanic you can guide him over to the damaged tyre, he'll pick it up and you manoeuver him over to the pile of the new tyres to change it. Changing the tyres is a little awkward at first, but you'll soon get the hang of it.

To activate the two mechanics and, once you've topped up on fuel and tyres, and the Grand Prix driver, you manoeuver the driving wheel over the figure and click the fire button; you then control that figure until you press the fire button again.

This indicates how much fuel you've got in the tank. Be careful when you're topping up ... if you don't stop before you fill the tank, it'll register empty and you'll have to start the whole process again.

You'll find you come across random cars in the race every 30 seconds or so. The best way to tackle them is to hang around close on their tail and, as soon as you see a gap, hit the fire button and 'turbo-charge' through the gap!



Crashes
The kerb miraculously stops you even after the most drastic errors, but murders the tyres and wipes off all your speed. Tyre blowouts actually skid you off the left-hand side of the track and that's exactly where you stay until the end of the race!



Acceleration
You've got an advantage over the computer's car in that you can zoom along at 251mph, whereas the 64 can muster no more than a measly 240mph top-whack. The fire button on the joystick can be used to 'turbo-charge' your acceleration, applying 'serious welly' as Nikki Lauda clones would say.



Observation
Always judge the degree of viciousness you use in car-to-car combat by watching the state of the other car's boots on-screen, besides your own!



Behave like an Italian racing driver with trattoria menu name by viciously ramming the opposition into the side of the track. If you're playing the computer, you'll notice that it almost always visits the pits for a tyre change if you manage to damage them at the start ... this is known in the trade as the 'Banzai Spaghetti' technique.



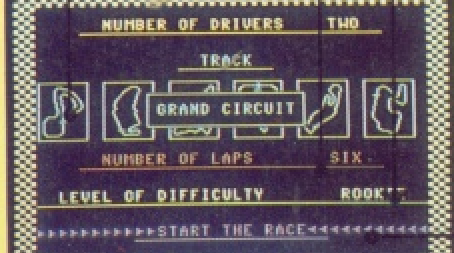


If you look carefully at your tyes, you'll notice they change colour each time you scrape the grass verge or bump into a rival racing car. You don't have to worry about the change of colour too much, until it turns yellow ... at this point, you'll have to become a 'Sunday Afternoon' driver and poodle round to the pits.

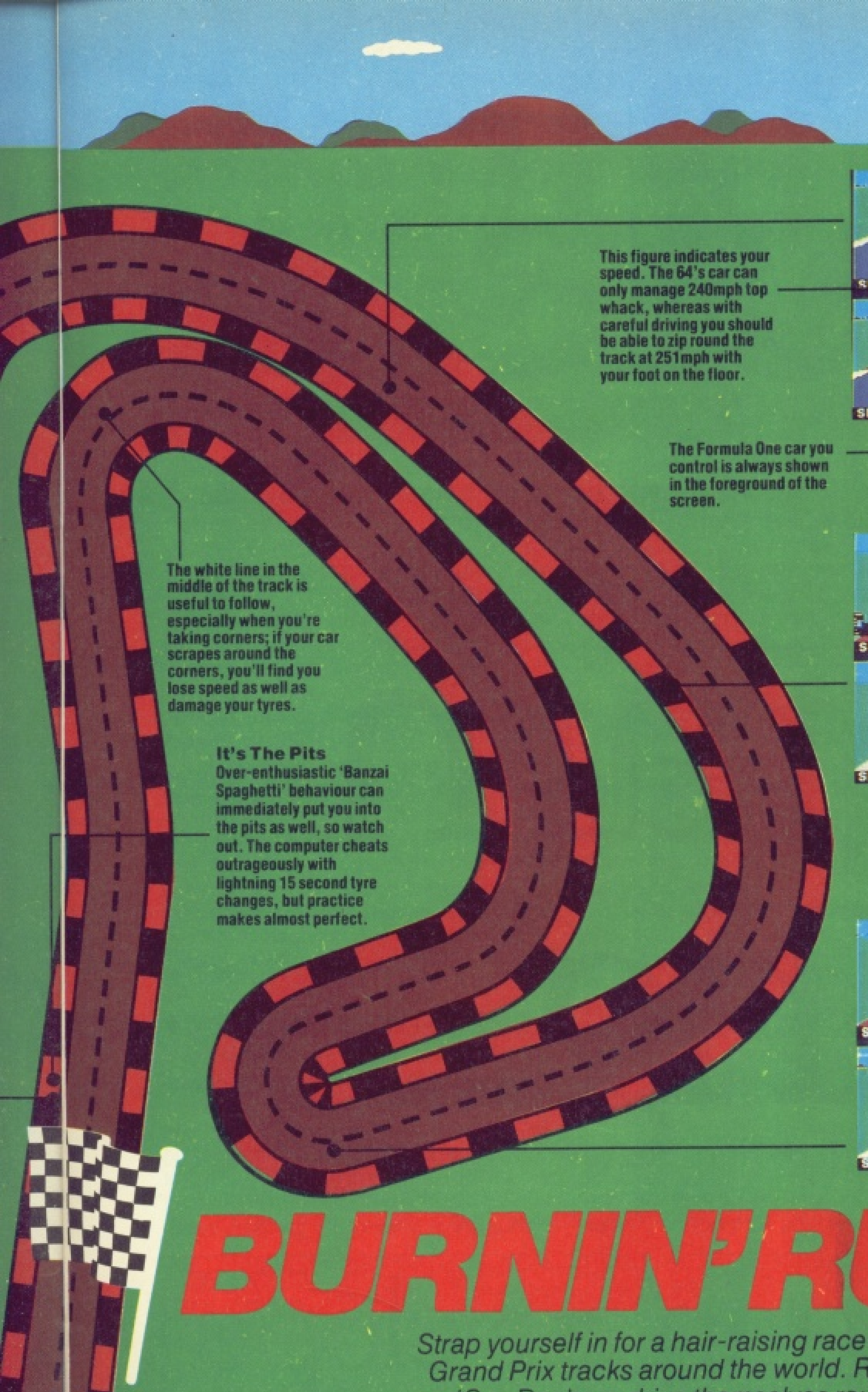
There are six Grand Prix racing tracks from around the world to choose from, and you also opt to play the Grand Circuit which means you get to race around all six circuits.

You have the choice of three, six or nine laps; if you're going to select nine laps on the Grand Circuit, make sure you've got an hour and a half to spare!

There are three levels of difficulty: Rookie, Semi-Pro and Pro; Rookie level's fairly easy for beginners, but if you reckon yourself as a would-be Alon Prost then switch on to Pro level and hang on to your helmet!



When you've selected the number of players, the circuit you want to race on, the number of laps and the level of difficulty, move the arrowed line cursor down here and press the fire button on your joystick to start. If you're not happy with the race at any time, you can call up the start screen again by pressing the Restore key.



This figure indicates your speed. The 64's car can only manage 240mph top whack, whereas with careful driving you should be able to zip round the track at 251mph with your foot on the floor.



Overtaking
Racing and beating a human opponent to motive pulp is where the killer thrills begin. When you're in front, use the other screen as a 'rear view mirror', blocking any advances on your car. If you're unlucky enough to be the 'tail-end Charlie', bluff it out with dummy moves to make exploitable gaps in the traffic.

The Formula One car you control is always shown in the foreground of the screen.

The white line in the middle of the track is useful to follow, especially when you're taking corners; if your car scrapes around the corners, you'll find you lose speed as well as damage your tyres.

It's The Pits
Over-enthusiastic 'Banzai Spaghetti' behaviour can immediately put you into the pits as well, so watch out. The computer cheats outrageously with lightning 15 second tyre changes, but practice makes almost perfect.



Random Racers
Stray, or random, cars often present problems by blocking your path to victory ... and often seem to slow you down just to wind you up. Don't get annoyed, though, or you'll end up on the verge with white tyres. Your best bet is to hang on to their wretched tails and go for the gaps ...

This circuit diagram (pun intended) shows your position on the track as a flashing cursor; experienced drivers will keep one eye on the circuit so that tight corners won't come as too much of a surprise.



Cornering
Use the 'racing line' in the middle of the track, straightening out on the bends for fastest cornering ... but avoiding curb-crunching at all costs; erratic driving of this ilk loses speed and guts out of the tyres.

BURNIN' RUBBER...

Strap yourself in for a hair-raising race around some of the fastest Grand Prix tracks around the world. Racing fanatic Roger Willis *and* Sue Denham *drive themselves round the bend with the CBS/Epyx package* Pitstop II.

Car-racing simulator games seem to be two-a-penny nowadays, but *Pitstop II* is different. Fans of its predecessor, *Pitstop*, will be pleased to hear that none of the thrills are gone ... indeed, they're doubled! The horizontally split screen presents a separate vista of two cars on the grid, showing both but majoring one on each half-screen. A player can take on the computer or two budding Grand Prix stars can tangle joysticks in heroic wheel-to-wheel savagery.

Wheels Meet Again?

Basic driving skills must be developed to swerve masterfully and zoom around the selection of well-known Grand Prix circuits... but the key to enjoyment, addiction and even fanatical dedication is the competitive element, best exploited via human opposition. It is possible, though, once you've had a bit of practice to blow the computer-driven opposition into the weeds.

Apart from getting, and staying, in front, complications arise through tyre-wearing trickery and the resultant necessity for pit-stops. Judging when to use the pits and getting good at the operations taking place therein add a great deal of fun, except when you're battling against the 64 who seems to have a great deal of experience in this messy task. Even experts cannot miss swopping rubber virtually every lap when you're at 'Pro' level (the highest of three levels; beginners would be well-advised to stick to 'Rookie' level until they get the hang of things) because the game is engineered cleverly to make avoidance of aggrevation pretty near impossible. If your opponent isn't out to get you, you can be sure that the other cars will be!

Nothing's perfect, and *Pistop II* certainly has its limitations. It's no good driving the jolly old bangers with just any old joystick — a good one is vital! Also, it can become very frustrating if your opponent crashes off-circuit with a terminally blown tyre because there ain't nothing left to do except cruise around and wave to the exultant crowds — if there were any, that is. This premature ending to the automative fisticuffs can be particularly annoying when it happens in the middle of a good ol' ding-dong. 'Spose it's just the rules of the game though ...

If you see yourself as a budding Mario Andretti clone, you could do a lot worse than shelling out £9.95 for the cassette version of *Pitstop II* (or £14.95 for the disk version) and getting your first few hundred hours of Grand Prix experience under your safety belt on the 64.

PROTECT & SURVIVE

Protecting your listings can often be more trouble than it's worth. But if you've got something to hide, keep it concealed. . . with a little bit of help from Max *'Big Brother'* Philips!

A bug that bites many a programmer is the strange desire to bury a listing under a veil of secrecy. While this is debatably a less important issue than stopping people from copying your programs, it's still a popular pastime and occasionaly a very useful thing to be able to do.

It is, however, hard to do properly. Ask yourself — should you be protecting your last program or writing the next? A good reason for hiding a listing is to stop someone cracking a password system or cheating at your latest adventure game. You may even want to bury a hidden serial number in each copy of a program. Well, it's all possible . . .

The Protection Racket

If you still want protection, it must be said now that you can never *totally* protect a listing, especially if it's in Basic. It's a gambler's game: you try to put more effort into protecting the listing than someone cares to put into cracking it. What we'll do here is take a look at some simple 'tricks' you can use, but be warned that this is only a starting point for you to develop your own system. Even if the codebusters haven't met these tricks before, they'll certainly know all about it once they've finished reading!

The golden rule to bear in mind is that any sensitive stuff in a Basic program should be encrypted so that even if someone got to have a good look at the listing they'd be none the wiser. Of course, the 'brute force' method of protection is to alter the program so that it won't list, and there are hundreds of possible techniques to consider . . .

Ask anyone about protecting listings and, with a token shrug, you'll get "Oh yeah, there's a single POKE that does it". Want a bet? There *is* a POKE, but it's almost impossible to build it into a program so that the listing never becomes visible. Try it for yourself — load a sample program and then type:

```
POKE 774,0
```

LISTing it now will only give you the line numbers up on-screen. Addresses 774 and 775 are collectively called 'the List vector', and hold the address of the part of Commodore Basic that lists out lines. By changing that address, you can relocate the LIST command to anywhere in memory you like. Personally, I much prefer to POKE in the address of the 64's warm-start routine with the following commands:

```
POKE 774,PEEK(808)
POKE 775,PEEK(809)
```

Unfortunately, there's no way that a program can execute these POKEs as it loads into memory. The only way to make this a sensible tree to bark up is if the program auto-started everytime it was loaded — it could then disable LIST, Run/Stop and Restore, and no-one would ever stop and list it. But as you probably know, it's very hard to make a Basic program auto-start on the 64.

What we need is some way of tampering with the program itself so that it foils the LIST command. Key in the following short program so that we can experiment on it:

```
10 REM **TESTME**
20 FOR I=1 TO 10
30 PRINT I
40 NEXT I
50 PRINT "DONE"
```

Once done, have a look at the accompanying diagram that details exactly how the program is stored in memory. Each Basic line starts with two bytes that tell Basic where the next line starts; this is known as the 'link field' — it links the lines together. The next two bytes are the line number of that line, and then there's the line itself which is encoded in it's own sweet way. Each line ends with a zero byte and the next one begins straight after. Finally a link field of two zeros signals the end of the program.

GOTO, GOSUB and LIST all use the link fields to find their way round the program, but RUN doesn't. You can therefore hide lines by POKEing a link field with the

MEMORY MATTERS

This here's an explanation of how the five-line test program given in the text is stored in memory. Points to note are the first two bytes that make up the link field, the zero bytes at the end of each line (E.O.L.), and the two zero bytes that signify the end mark. Now try adding the POKEs and — Hey Presto! — lines 20, 30 and 40 disappear.

Address	LINK	LINE	BYTES
2048	0 (start mark)		
2049	18 8	10 0 (LINE10)	143 REM, 32 SPACE, 42 *, 42 *, 84 T, 69 E, 83 S, 84 T, 77 M, 69 E, 42 *, 42 *, 0 EOL
2066	33 8	20 0 (LINE20)	129 FOR, 32 SPACE, 73 I, 178 =, 49 1, 32 SPACE, 164 TO, 32 SPACE, 49 1, 48 0, 0 EOL
2081	41 8	30 0 (LINE30)	153 PRINT, 32 SPACE, 73 I, 0 EOL
2089	49 8	40 0 (LINE40)	130 NEXT, 32 SPACE, 73 I, 0 EOL
2097	62 8	50 0 (LINE50)	153 PRINT, 32 SPACE, 34 ", 68 D, 79 O, 78 N, 69 E, 34 ", 0 EOL
2110	0 END MARK		

POKE 2049,49 POKE 2050,8 (link of line 10 redirected to address 2089)

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address of a line further down the program. Try:

POKE 2049,49
POKE 2050,8

This makes the first link field point to the last line of the program. Now type LIST and you'll find that lines 20,30 and 40 no longer appear; LIST follows the links and skips over them. What's happened here is that you've created a hidden patch of memory inside the Basic program; you could just as easily have some data POKEd in it or even a small machine code routine. Now RUN the program and you'll find that although they don't exist on the on-screen LIST, they still work!

Now for the catch. GOTO and GOSUB can't find hidden lines (they follow the links remember). Secondly, whenever you alter a program or even just LOAD it, a part of Basic (politely called the re-linker) fixes all the links in the program. The hidden lines re-appear. Foiled again!

What's New?

We can, however, use this technique to half-NEW a program. From first principles, when you enter NEW, Basic makes the first link field into two zeros to signal the end of the program and then alters locations 45 and 46 to hold the address of the first byte after this end mark. Addresses 45 and 46 are called VARTAB and hold the address where the current Basic program ends in memory.

However, if we leave VARTAB alone and just POKE two zeros into the first link field, we still have a program in memory but Basic can't find it (this is called a semi-NEWed program). So, to protect the program enter:

POKE 2049,0:POKE 2050,0

You can still SAVE and LOAD as normal but, before you can use the program, you'll have to POKE addresses 2049 and 2050 back to their original values. It's therefore prudent to PEEK them and make a note of their values *before* you protect the program.

Before we move on to greater things, there's one very popular trick that involves altering the line number field rather than the link fields in order to produce an indelible copyright message or otherwise interesting remark statement. Add a message at the end of your program, such as:

9999 REM KILROY WOZ HERE

Then, add these lines at the start of your program, run them and then delete them:

```
1 I=PEEK(45)+PEEK(46)*256-4
2 IF PEEK(I) <>0 THEN I=I-1:GOTO 2
3 POKE I+3,255:POKE I+4,255:END
```

These seek out Kilroy's line number and change it to 65535, which is an illegal line number and therefore extremely difficult to delete!

The Doctor Is In!

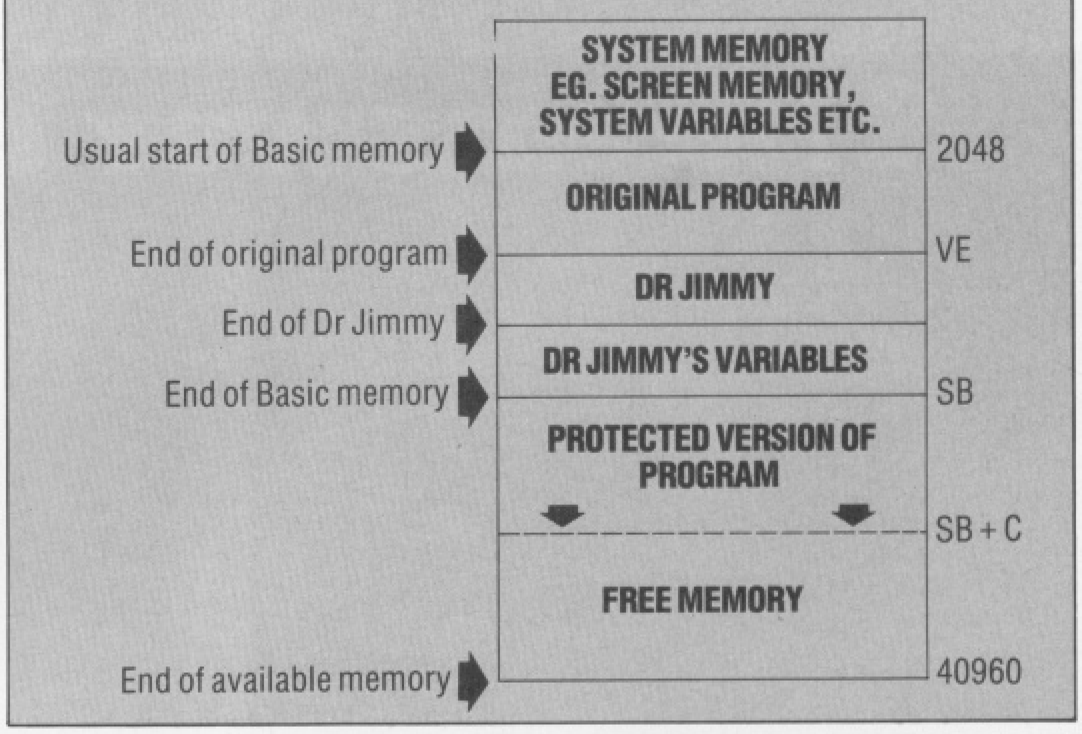
Enough of this frippery . . . and let's get down to a program that really does conceal listings. It's called *Dr Jimmy* and,

```
100 VS=2048:L=0:H=0:T=0
110 VE=PEEK(43)+PEEK(44)*256
120 SB=PEEK(55)+PEEK(56)*256+1
125 PRINT "SILENCE PLEASE..."
130 I=VS:C=0
140 FOR I=I TO I+4:POKE SB+C,PEEK(I):C=C
+1:NEXT I
150 POKE SB+C,0
160 FOR C=C+1 TO C+3:POKE SB+C,INT(RND(1
)*254)+1:NEXT C
170 IF PEEK(I)<>0 THEN POKE SB+C,PEEK(I)
:C=C+1:I=I+1:GOTO 170
180 IF I<VE THEN 140
200 H=INT((SB+C)/256):L=(SB+C)-256*H
205 PRINT CHR$(147):PRINT:PRINT
210 PRINT "POKE 45,";L;": POKE 46,";H:PR
INT:PRINT
220 H=INT((SB+1)/256):L=(SB+1)-256*H
230 PRINT "POKE 43,";L;": POKE 44,";H:PR
INT:PRINT
240 PRINT "POKE 55,0:POKE 56,160":PRINT:
PRINT
245 PRINT "REM NOW *SAVE* IT!":PRINT:PRI
NT
250 PRINT CHR$(19)
270 FOR T=631 TO 634:POKE T,13:NEXT T:PO
KE 198,4
```

The program above, *Dr Jimmy*, will protect all your Basic listings. First off, load the original, the POKE 43, PEEK (45); POKE 44, PEEK (46). Now load *Dr Jimmy*, then POKE 55, PEEK(45): POKE 56, PEEK(46)+8, and save the protected version. Reset the 64 and load the protected listing.

DR JIMMY'S MEMORY MAP

Here you'll see that the program to be protected is loaded in to the 64. *Dr Jimmy* is then loaded above it and RUN — it then copies the original into free memory, making changes as it goes, and then gives you the opportunity to SAVE the protected version. Re-start the 64, load in your new program and there you go . . . instant protection!



ADDRESSING THE 64

Name	Address	Function
TXTTAB	45 and 44	Holds the address where the current Basic program starts.
VARTAB	45 and 46	Holds the address where the current Basic program ends.
MEMSIZ	55 and 56	Holds the address of the highest memory location available to Basic.
NDX	198	Contains the number of characters waiting in the keyboard buffer.
Keyboard buffer	631-640	Holds characters waiting to be processed.
List vector	774 and 775	Holds the address of the LIST routines.
ISTOP	808 and 809	Holds the address of the 64's 'warm-start' routine.

We've made use of a number of useful locations in the memory map to achieve maximum trickery. Here's a table of the most useful of them — read and digest.

although it looks bizarre, the program should deter all but fanatics from looking at your masterwork. There's a vicious rumour going round that there are some 64 owners who don't read *Y64*, but these poor unfortunates are going to be more than sorry next time they try breaking into one of your listings. Indeed, even if you're using the program yourself you've got a tough job on your hands.

Dr Jimmy doesn't actually go to the trouble of encrypting a program — it just adds a few extras to each line that'll stop LIST printing anything but the line numbers up on-screen and fool the dreaded re-linker. But these extras don't prevent RUN and all the other commands from working properly. Of course, there are some overheads to this — every line grows by five bytes and the conversion process itself means that you can only protect programs up to about 16K in length. But it's still rather clever . . . have a look at the memory map to see just how clever!

To use *Dr Jimmy*, first type in and save its listing. Next, make sure that you've got an original copy of your final masterpiece; once protected, it's not easy to restore the listing! Now, enter:

```
POKE 43,PEEK(45)
POKE 44,PEEK(46)
```

This tells the 64 that Basic programs now start where the original ends so that you can LOAD *Dr Jimmy* without destroying your original. Now type:

```
LOAD "DRJIMMY"
```

Next, we want to seal off free memory ready for the protected version of your program, so input:

```
POKE 55,PEEK(45)
POKE 56,PEEK(46)+8
```

The '+8' part leaves some space for *Dr Jimmy*'s variables. Next, enter RUN and wait. Conversion is quite slow so be patient and, finally, you'll see the screen clear and a series of POKEs automatically execute. These prepare the protected program for SAVEing. Finally, SAVE the protected version with a new name. Don't even think of doing anything else before you SAVE it or else you'll spoil the whole spell!

You can now switch off your 64 (the easiest way of restoring its memory to normal) and load the protected listing. You can still add and delete lines from the listing so that at this point you could add a title and copyright message to the 'invisible' listing; you can even doctor a small section of the program by protecting it first and then adding all the 'public' lines afterwards.

How It Works

Dr Jimmy works by exploiting a strange anomoly in Commodore Basic. After the line number and link fields, it writes a phoney end-of-line mark (a zero byte) — this means that after LIST has printed the line number, it finds this and goes straight to the next line. Following the zero byte, line 170 POKEs in four magic numbers that allow Basic to execute the rest of the line as normal; this phoney end mark also throws the re-linker off the scent so that it never makes the hidden lines re-appear!

After it's generated the protected version of the program, *Dr Jimmy* halts and automatically executes some POKEs to make the protected version into an 'ordinary' Basic program so that you can SAVE it. The POKEs are executed by printing direct commands on to the screen and then filling the keyboard buffer with four carriage returns. When the program stops, the 64 dutifully types the four carriage returns for you and you're ready to SAVE. I'm afraid there's no way you can put these POKEs into a normal Basic program because they effectively make the program itself vanish as it's executing!

In The Beginning . . .

Obviously, this is just a starting point. You *could* alter the program to actually encrypt the Basic program, perhaps using a password; a hidden routine at the start of your program would then restore the encrypted program before continuing. But if you're serious about protection, you shouldn't discuss your final *Modus Operandi* with anyone. On the other hand, if you do come up with some interesting suggestions do let us know! You never know, we may be able to help . . .

Your 64 PROGRAMMER OF THE YEAR

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There'll be no limits to the subject matter or the number of programs you submit — just make sure it's all your own work. All submissions will be assessed on the programming skills displayed and their ability to carry out the function for which they were written.

The only handicap you've got is that we're going to impose a 10K limit on the amount of code you use. *(We've upped the limit to give you a bigger byte of the action. Ed.)* Of course, if you're into machine code, you've got an advantage ... but this isn't a test of who thinks best in binary. Each program will be judged for structure, use of sound, user-friendliness, professional polish and, above all, original ideas.

The best six programs submitted will be published in *Your 64*, one per issue starting in July 1985. The last possible date we can accept entries for the competition is October 31st, 1985 — but if you've already written a worthy program, send it off straight away or you'll miss out on the early judging.

The Winners

The six published programs will go into the final judging to choose the overall winner of the competition. But the best program won't just win its author the coveted accolade *Your 64* Programmer of the Year, there's also a brand-spanking new Commodore 128 up for grabs!

Of course, all six programs published will earn their authors a substantial fee from the magazine ... and Commdore UK are stumping up a bonus prize of your choice of Commodore software up to the value of £50 for each author. Can't be bad!

So, if you want your name up with the greats from the programmer's book of *Who's Who*, send your programs to Programmer of the Year, *Your 64*, 14 Rathbone Place, London W1P 1DE. Fame and fortune could come your way ... so get programming now!



Write a program ... and you could be in line to win a Commodore 128! Pictured here is the American version of this great 64-compatible computer.

Y64 MEGA GAME

THE FINAL FRONTIER?

Welcome aboard the Cobra Mk III for a spot of interplanetary trading. Your co-pilots are Teresa Maughan *and* Steve Broadhurst, *boldly going where none have been before . . .*

Everyone's heard of *Elite* — it was a smash on the BBC Micro, holding the number one spot in the charts for ages. Well, it's now been converted for the Commodore 64 by Firebird Software, and it's every bit as good as the original and in some respects it's even better.

Rough Trade

If you recall the classic games *Trader* and *Star Raiders,* you've got a pretty good idea of what *Elite*'s all about. You play the part of the commander of the Cobra Mk III trading and combat craft. . . and it's your task to zap about the eight galaxies and over 2,000 planets, buying and selling goods in order to make your fortune.

You begin your mission with the lowly title 'Harmless', but your object in life is to rise through various levels, such as 'Average', 'Competent' and 'Dangerous', until you achieve the esteemed rating of 'Elite'. Cash flow is quite important in the game — you start off with the simplest of weaponry and a mere 100 credits, so very quickly you'll have to work out when to buy more sophisticated lasers and so on and how to spot a good interplanetary bargain.

Probably the easiest way to make some quick readies is to adopt an alternative life-style and start trading in narcotics. However, you'll soon find that if you do, you'll soon earn yourself the title 'Fugative' and that means you're not only easy bait for the various pirate ships and bounty hunters. . . but the police will be after you as well!

Star Wars?

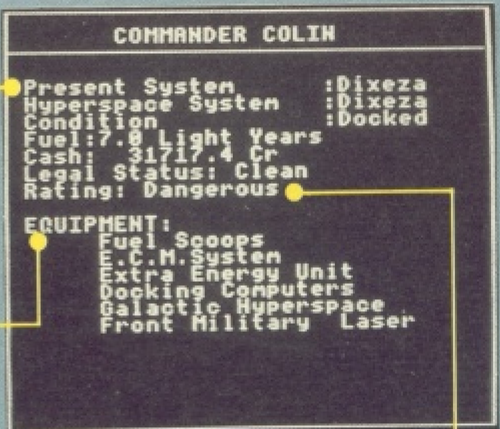
To trade successfully will almost certainly require you to fly into politically unstable planetary systems, and that's where you'll need some fairly heavy-duty weaponry to survive.

You'll soon be able to recognise the approach of enemy craft, and tht's the time to act. . . before it's too late. Dogfights can be great fun, but you've got to be good — there's no quarter given here!

STAGE 1

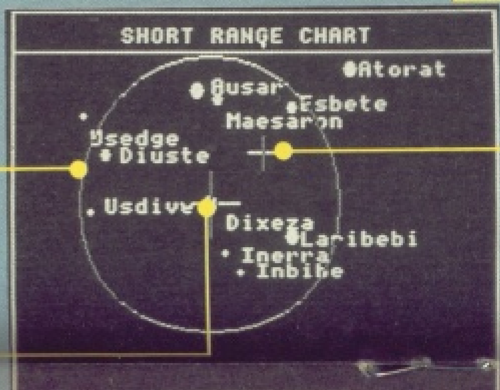
The 'present system' box refers to the planetary system that you're now occupying. The 'hyperspace system' box tells you the planetary system that you're headed for.

As you progress through the game, you'll be able to equip your ship with all sorts of fancy hardware that'll mean you can beat off the baddies. When you first start, though, you'll have minimum equipment on-board.



This chart shows all the registered planets in the galaxy, and the radius of the circle indicates the range you can jump in hyperspace.

The position of your spaceship, Cobra Mk III, is indicated by a large cross on the





Once you've selected your target planet, details of its economy, level of technology and main life-form are displayed. After you've played the game for a while, you'll be able to see from this data whether or not it's worth a visit.



This chart shows you your current position, and that of the target systems in the galaxy. There are eight galaxies in all (one of which is shown on-screen) and each contains 250 planets.

According to how good you are at the game, you'll be awarded a skill rating that ranges from 'harmless' up to the dizzy heights of 'elite'. Achieving the higher levels depends on the number of enemy ships you can destroy and your ability to trade successfully.

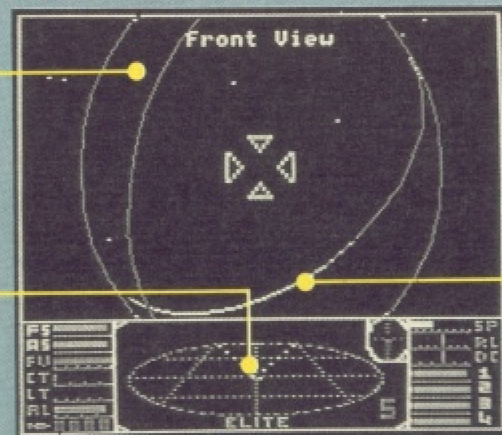
The star cursor is moved using the joystick to the planet you want to find out about. Once placed over the planet, you can access a complete data profile on its trading potential.

When you start playing Elite, your Cobra Mk III is hardly the most equipped vehicle in the galaxy — all you've got on-board is a single forward-firing pulse laser, three homing missiles, fuel and 100 credits. It's important that you fly your spaceship with care to begin with, and make sure that you visit all the nearest planets first to build up your credit

STAGE 2

When you leave a space-station, you see the target planet ahead of you — now prepare yourself for a jump in hyperdrive.

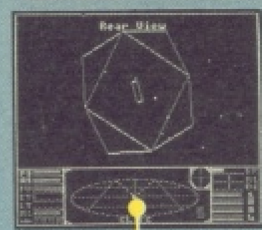
Before you attempt a jump into hyperspace, you'd be well advised to make sure you've put a few miles between you and the space-station ... or else there'll be big trouble!



Jumping from one galaxy to another requires the use of the intergalactic hyperdrive, which can get very expensive; the only place you can get hold of a hyperdrive is a planet on a tech level 10 or higher.

All the planets in Elite are of varying sizes and spin in different directions; the way to tell the axis of rotation is to check out the ellipse on the planet's surface.

You'll need some practice actually docking your spaceship into the space-station — it's not so easy as the entrance to the space-station faces the planet you've just come from and spins in tandem with the planet you're going to. Your best bet is to practise the docking procedure on the home planet, Lava — there you can get a few trial runs in for free!



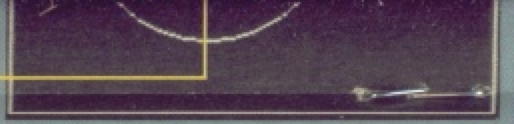
Pressing one of the function keys allows you to see what's happening out of the rear view window — useful if you're being attacked by enemy spaceships from behind.



Once you've got a fair distance from the space-station, press the 'H' key to start the hyperdrive countdown; a clock ticks away in the corner of your console indicating the time you've got left before you're flung into the far reaches of

On coding for station depart you'll be advised to accept a 10 second MemnSomn to dispense with any experience you've had of the passage between the docking bay and Coriolis station Egress. The screen will then show a break pattern, which is the passage through the protective field over the Coriolis entrance tunnel.

The position of your spaceship, Cobra Mk III, is indicated by large cross on the screen.



forward-firing pulse laser, three homing missiles, fuel and 100 credits. It's important that you fly your spaceship with care to begin with, and make sure that you visit all the nearest planets first to build up your credit rating.

docking procedure on the home planet, Lava — there you can get a few trial runs in for free!

window — useful if you're being attacked by enemy spaceships from behind.

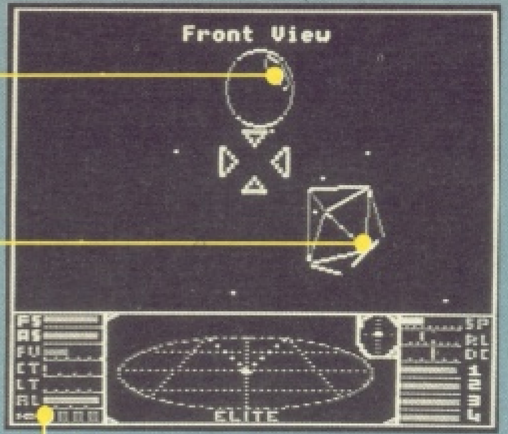
hyperdrive countdown; a clock ticks away in the corner of your console indicating the time you've got left before you're flung into the far reaches of outer space.

which is the passage through the protective field over the Coriolis entrance tunnel.

STAGE 3

Once you've jumped into a new planetary system via hyperdrive, you'll see the target world far off in the distance.

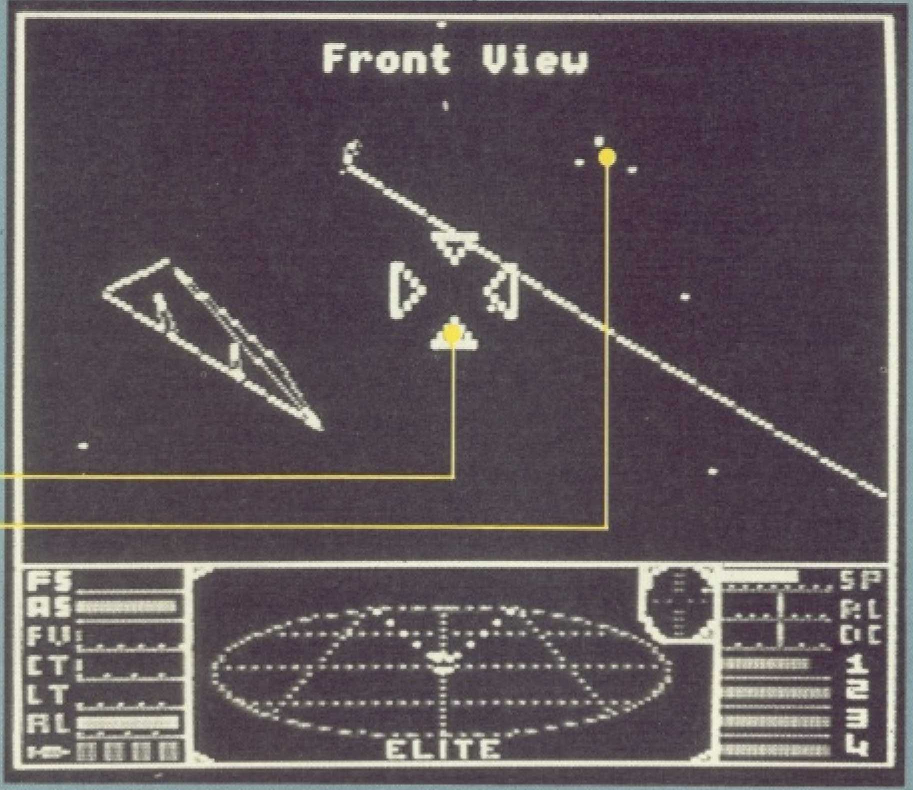
Even in the quietest planetary systems, there are many unseen dangers lurking behind an asteroid — it's therefore advisable to get to the space-station as quickly as you can. Once you've got velocity at a maximum, you can speed up your progress by pressing the 'interspace' key that allows you to cross great stretches of space in one move.



Watch out when you're using the 'interspace' facility as it does attract pirates, bounty hunters and intergalactic police. Just make sure your missiles are primed.

The crosshairs on-screen are the sights you see to line up your laser canon on to an enemy target. There are three different types of crosshair, depending on the weapon you're using.

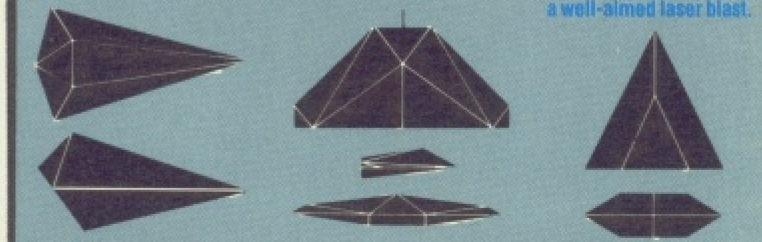
If you spot a tightly bunched group of craft on-screen, the chances are that you're about to be attacked by a pirate squadron. You'd be well advised to destroy them before they get too near and separate — you won't have a chance once that's happened.



Freighters are usually large pirate vessels; these come equipped with anti-missile ECMs as well as very powerful shields to deflect your missiles.

The Mambers are not unlike your own ship, Cobra Mk III — which means if you take them on, you've got a pretty even battle on your hands.

The police Vipers are very fast ships that can often out-manoeuvre your missiles. However, their shields are fairly weak and are easily penetrated with a well-aimed laser blast.



When you're 'dog-fighting' in space, it's best to reduce your speed to aid manoeuverability, fire your missiles sparingly, and only blast off your energy bombs as a last resort. Avoid the temptation to blast away indiscriminately as your lasers will overheat and become inoperative for a short period ... and in the heat of battle, that could spell trouble.

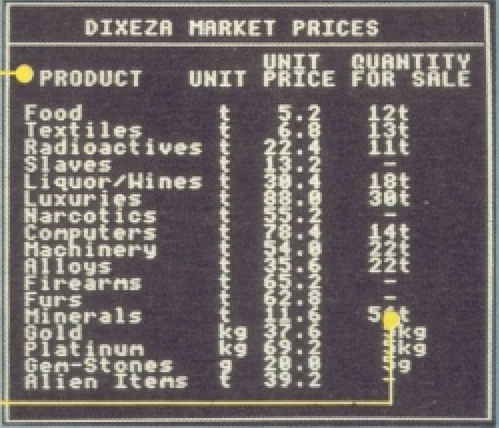


Docking with a Coriolis space-station is no mean feat, unless your spaceship is kitted out with a docking computer in which case it's a cinch. When you're preparing to dock, the best tactic is to overshoot the planet so that you're facing the space-station and spinning in sympathy with the planet (à la 2001). Then you've got to reduce your speed to virtually zero; entering the space-station at speed is likely to cause all sorts of damage to your craft.

STAGE 4

The product column indicates the merchandise on offer on each planet. Prices of each item vary drastically from planet to planet — it's up to you to anticipate these price changes so that you make the profit required to buy all the 'goodies' you'll need to race around the galaxies safely.

This column indicates the quantities of each item that's currently in stock. You can purchase up to 30 tonnes of merchandise.



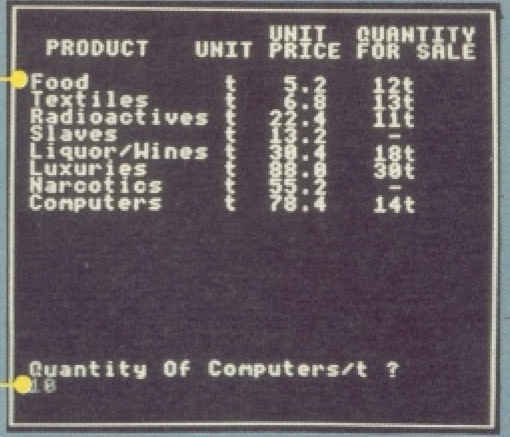
DIXEZA MARKET PRICES

PRODUCT	UNIT	UNIT PRICE	QUANTITY FOR SALE
Food	t	5.2	12t
Textiles	t	6.8	13t
Radioactives	t	22.4	11t
Slaves	t	13.2	-
Liquor/Wines	t	30.4	18t
Luxuries	t	88.0	30t
Narcotics	t	55.2	-
Computers	t	78.4	14t
Machinery	t	54.0	22t
Alloys	t	35.6	22t
Firearms	t	65.2	-
Furs	t	62.8	-
Minerals	t	11.6	5t
Gold	kg	37.6	kg
Platinum	kg	65.2	kg
Gem-Stones	g	20.0	g
Alien Items	t	39.2	

When you're analysing market prices on the planets you visit, it's worth noting down the variations on a piece of paper; you'll soon see that there's a pattern involved, and it'll help you predict what goods are likely to be in demand on any particular planet before you cross the universe to visit it.

Purchasing merchandise is almost instantaneous — each item is offered in turn and you've got the choice to buy or move on to the next item.

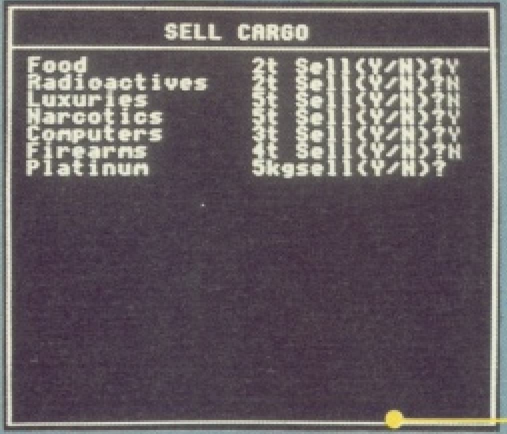
If you wish to buy some merchandise, type in the amount you're after and the autoSCAM modules will load your purchase into your craft immediately



PRODUCT	UNIT	UNIT PRICE	QUANTITY FOR SALE
Food	t	5.2	12t
Textiles	t	6.8	13t
Radioactives	t	22.4	11t
Slaves	t	13.2	-
Liquor/Wines	t	30.4	18t
Luxuries	t	88.0	30t
Narcotics	t	55.2	-
Computers	t	78.4	14t

Quantity Of Computers/t ?
10

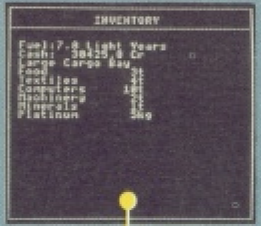
The idea of taking merchandise from one planet to another is to make a healthy profit, that is buying cheap and then selling to a planet where they're in great demand. Narcotics, computers and luxuries can make you a lucrative profit, but watch out for the pirates and police.



SELL CARGO

Food	2t	Sell(Y/N)?Y
Radioactives	2t	Sell(Y/N)?N
Luxuries	5t	Sell(Y/N)?N
Narcotics	3t	Sell(Y/N)?Y
Computers	3t	Sell(Y/N)?Y
Firearms	4t	Sell(Y/N)?N
Platinum	5kg	sell(Y/N)?

To make money trading is no easy task and, until you've got sufficient financial status, you'd be well advised to deal only in food and textiles. When you're considering which planet to visit, check out its economic profile carefully especially the higher level systems.



You can, at any time, call up the INVentory of your spaceship and see the contents of your cargo bay, the health of your bank balance and the state of your fuel tanks.

Once you've docked into a space-station, the selling process is automatic. Of course, there's no need to trade at all, especially if the prices are too low, and you can take off just as soon as you've checked out how dismal the market is

Keeping a list of the prices from around the planets, you'll soon work out when 'the price is right'. Make sure you don't hang on to illegal contreband for too long, though ... or the pirates or police will get you.

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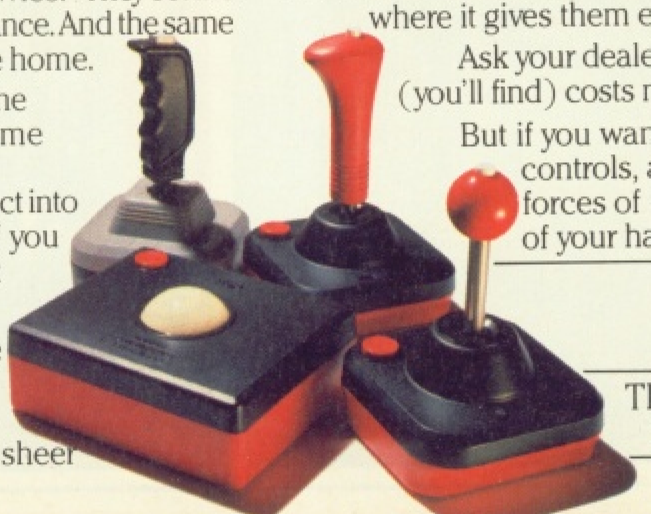
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THE FINAL FRONTIER?

In-flight battles can also be very lucrative; you can increase your legal status and pick up cargo from the wreckage but, again, you've got to have more than earned your wings to get this far.

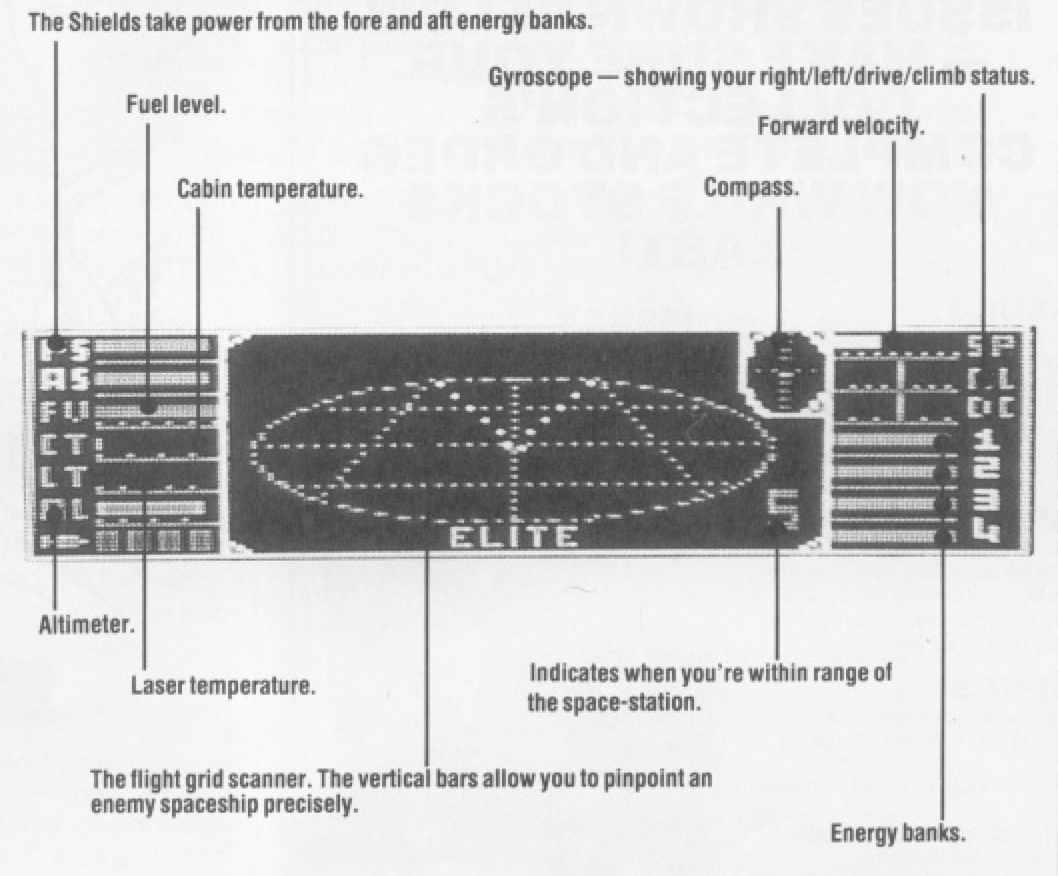
Firebird Software has added a feature to the original game — providing three different on-screen sights indicating the type of laser you're using to blast the enemy ships. As an aside, try and keep out of the way of Thargoid vessels — apparently, the crew have had their fear glands surgically removed (*Sounds painful! Ed.*).

The 64 version of *Elite* also includes a breed of alien called Trumbles that can be purchased at various space-stations. These cute and cuddly creatures multiply at a terrific rate and, as Firebird isn't letting on how to get rid of the darn things, you soon end up with them plastered all over the screen to the point that you don't know where you're going! Of course, if anyone out there can tell us how to get rid of the pesky beasts, write in fast! (*There'll be a prize of five new software packages for the first solution we receive. Ed.*).

Read All About It!

The package includes a 64-page booklet called the Space Trader's Flight Training Manual that covers everything you wanted to know about *Elite* . . . but were afraid to ask! No wonder, you may say, that it takes around 72 playing hours just to get up to the level of 'Dangerous'. And if you're thinking of exploiting the bugs in the BBC Micro's version of *Elite*, forget it. . . we've tried, and Firebird Software has already got to the code first!

At the time of writing, *Elite* for the 64 is still in its 'finishing-off' stages — Firebird has still to add some new fonts to some of the on-screen goings-on, and the company's promising one or two other little surprises for the final version. One thing Firebird is quite confident about is the price . . . it'll set you back £14.95 for the cassette version, and £17.95 for those lucky enough to own a disk drive.



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- Extended Basics compared — are they value for money?
- The KoalaPad on the bench.
- Legend's *Valhalla* — the best adventure since *The Hobbit*?
- Interested in 50 on-screen colours? You should be!

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- ACOS — the high-speed cassette!
- The virtues of Pilot, Forth, Comal and Pascal.
- UK bulletin boards for the 64.
- The Edge's *Quo Vadis*.

ISSUE 5
- Lightpens — how they work.
- Five graphics art packages on the bench.
- US Gold's *Zaxxon* versus Dynavision's *Havoc*.
- All-in-one assembler, disassembler, monitor and loader listing.

ISSUE 6
- Commodore's *Music Maker*.
- Activision's *Ghostbusters* — the game!
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- Invaluable routines for adventure program writers.

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- Llamasoft's Jeff Minter speaks out!

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- Ariolasoft's *Raid On Bungeling Bay*.
- Musical matters — miracles on the SID chip.
- Amazing listing — *3D Maze*.

ISSUE 9
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- Commodore's *International Basketball* and CBS/Epyx's *Mission Impossible*.
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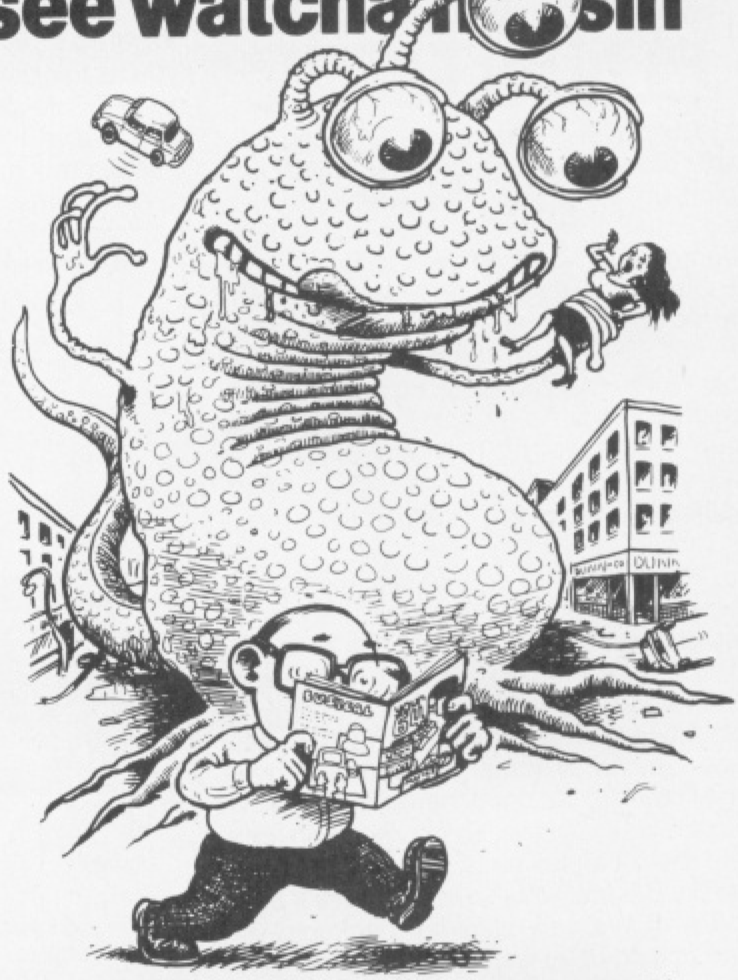
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20 QUESTIONS

Hands up all those of you who enjoy revising for exams! Well, for the 99.99 per cent of readers who've not raised their hands, Bernie Douglas *presents a fun way to revise — by setting yourself multiple choice questions with the* Y64 Educatabase!

Often the best way to revise for an exam is to settle down with a textbook and plough through it from one end to another ... but you'll probably get more enjoyment from watching paint dry!

What we've got here is a simple program that asks you to input 20 questions, with four answers for each (one of which will be the correct one). Once you've input all the questions and answers, you can save them all to tape for future reference. Of course, you could always get together with a few friends and do a number of quizzes between you, and then you won't know the answers unless you've really swotted the subject!

Billed as a revision program, you could use the *Y64 Educatabase* for any subject — famous names from the pop world, gardening questions and so on. The important thing is to have some fun ... there's no reason why learning a subject should be boring. Go for it!

```
1000 GOSUB 2000:REM SETUP ARRAYS
1005 IF FLAG=1 THEN 1020
1010 GOSUB 3000:REM ENTER QUESTIONS
1020 GOSUB 4000:REM RANDOMIZE QUESTIONS
1030 GOSUB 5000:REM PRINT QUESTIONS
1040 PRINT "■■FROM A POSSIBLE TOTAL OF
50 QUESTIONS"
1050 PRINT:PRINT"         YOU HAD ";SC;" C
ORRECT ANSWERS"
1060 PRINT:PRINT"         OR ";SC*5;"%"
1070 PRINT:PRINT:PRINT:PRINT "PRESS   1.
TO RUN THE QUESTIONS AGAIN"
1080 PRINT:PRINT"         2. TO ENTER NEW
DATA"
1085 PRINT:PRINT"         3. TO QUIT
1090 GET A$:IF A$="1" THEN 1020
1100 IF A$="2" THEN RUN
1110 IF A$="3" THEN STOP
1120 GOTO 1090
```

Lines 1000-1120 Comprise the main control loop. This part of the program calls each of the routines in turn, and then prints up a score at the end.

```
2010 DIM Q$(20):REM QUESTIONS ARRAY
2025 DIM A$(20),B$(20),C$(20),D$(20)
2030 DIM R(20):REM RANDOM POINTER INDEX
2040 DIM R$(20):REM CORRECT ANSWERS
2050 PRINT "■■"
2060 POKE 53281,6:POKE 53280,6
2065 PRINT:PRINT "         T H E  'Y O U
R  64'"
2070 PRINT "■■  MULTIPLE CHOICE REVISION
 PROGRAM"
2080 FOR C=1 TO 6:PRINT:NEXT C
2090 PRINT "      LOAD EXISTING FILE  Y/N
? "
2100 GET A$:IF A$="" THEN 2100
2110 IF A$="Y" THEN GOSUB 7500:FLAG=1:RE
TURN
2120 IF A$<>"N" THEN 2100
2130 RETURN
```

Lines 2000-2110 Set up the arrays required to hold the questions and answers. You're allowed up to 20 questions, with four corresponding answers.

```
3010 FOR C=1 TO 20
3020 PRINT "■":PRINT:PRINT
3030 PRINT "PLEASE ENTER QUESTION NO:";C
3040 PRINT :INPUT I$
3050 PRINT :PRINT "     IS THIS QUESTION
OK?  Y/N"
3060 GET Y$:IF Y$="" THEN 3060
3070 IF Y$="N" THEN 3020
3080 IF Y$<>"Y" THEN 3060
3090 Q$(C)=I$
3100 PRINT "■■PLEASE INPUT THE MULTIPLE
ANSWERS TO     QUESTION NO:";C
3110 PRINT:PRINT "Q.  ";:P$=Q$(C):GOSUB 6
000
3120 PRINT"■■■■■■■■":PRINT "ANSWERS:-";PR
INT
3130 INPUT "A.";I$:A$(C)=I$
3140 PRINT:INPUT "B.";I$:B$(C)=I$
3150 PRINT:INPUT "C.";I$:C$(C)=I$
3160 PRINT:INPUT "D.";I$:D$(C)=I$
3170 PRINT:PRINT
3180 INPUT "ENTER THE CORRECT ANSWER A,B
,C,D.";I$
3190 IF ASC(I$)<65 OR  ASC(I$)>68 THEN P
RINT "■";:GOTO 3180
3200 R$(C)=I$
3210 PRINT:PRINT:PRINT "      PRESS ANY K
EY TO CONTINUE."
3220 GET A$:IF A$="" THEN 3220
3230 NEXT C
3240 PRINT :PRINT"■■■        SAVE FILE TO
CASSETTE? Y/N"
3250 GET A$:IF A$="" THEN 3250
3260 IF A$="Y" THEN GOSUB 7000:RETURN
3270 IF A$<>"N" THEN 3250
3280 RETURN
```

Lines 3000-3240 This routine asks you to enter a question, checks that it's OK, and then places this in array Q$(). You're then asked for four answers (one of which should be correct) which are then placed into arrays A$(), B$(), C$() and D$(). Once done, you're asked for another question and four answers ... up to 20.

```
4005 FOR C=1 TO 20:R(P)=0:NEXT C
4010 FOR C=1 TO 20
4020 P=INT(RND(0)*20)+1
4030 IF R(P)<>0 THEN 4020
4040 R(P)=C
4050 NEXT C
4060 RETURN
```

Lines 4000-4060 Set a random sequence (held in array R()) for the input questions to be displayed on-screen.

```
5005 SC=0
5010 FOR C=1 TO 20
5020 PRINT "■"
5030 PRINT "QUESTION NO.";C:PRINT
5040 P$=Q$(R(C))
5050 GOSUB 6000
5060 PRINT:PRINT "      WHICH IS THE CORR
ECT ANSWER?"
5070 PRINT:PRINT "A.  ";:P$=A$(R(C))
```

```
5080 GOSUB 6000
5090 PRINT:PRINT "B. ";:P$=B$(R(C))
5100 GOSUB 6000
5110 PRINT:PRINT "C. ";:P$=C$(R(C))
5120 GOSUB 6000
5130 PRINT:PRINT "D. ";:P$=D$(R(C))
5140 GOSUB 6000
5150 PRINT:PRINT:PRINT
5160 INPUT "ENTER  A,B,C,D";I$
5170 IF ASC(I$)<65 OR ASC(I$)>68 THEN PR
INT "□";:GOTO 5160
5180 IF R$(R(C))=I$ THEN PRINT:PRINT I$;
".   IS CORRECT":SC=SC+1:GOTO 5200
5190 PRINT:PRINT I$;".    IS INCORRECT"
5200 PRINT:PRINT "        ANY KEY TO CONT
INUE"
5210 GET A$:IF A$="" THEN 5210
5220 NEXT C
5230 RETURN
```

Lines 5000-5220 Ask the questions in the random sequence set up in R(), displaying each of the four possible answers. It then checks your answer alongside the correct one, updates the score and moves on to the next question.

```
6010 IF LEN(P$)>40 THEN 6050
6020 FOR N=1 TO LEN(P$)
6030 PRINT MID$(P$,N,1);:
6040 NEXT N:PRINT:RETURN
6050 N1=40
6060 IF MID$(P$,N1,1)<>" " THEN N1=N1-1:
GOTO 6060
6070 FOR N=N TO N1
6080 PRINT MID$(P$,N,1);
6090 NEXT N:PRINT
6100 P$=MID$(P$,N1+1)
6110 GOTO 6010
```

Lines 6000-6110 This routine takes the string held in P$ and prints it in a format that makes sure no words are split over the edge of the screen.

```
7010 PRINT "[CLR]"
7020 INPUT "ENTER FILENAME:";I$
7030 OPEN 1,1,1,I$
7040 FOR C=1 TO 20
7050 PRINT#1,Q$(C) :REM QUESTIONS
7060 PRINT#1,A$(C) :REM MULTIPLE ANSWERS
7070 PRINT#1,B$(C)
7080 PRINT#1,C$(C)
7090 PRINT#1,D$(C)
7100 PRINT#1,R$(C) :REM CORECT ANSWER
7110 NEXT C
7120 CLOSE1
7130 RETURN
```

Lines 7000-7140 This is the 'save' routine, allowing you to save the questions to cassette for future reference or for swopping quizzes with your mates.

```
7510 PRINT "[CLR]"
7520 INPUT "ENTER FILENAME:";I$
7530 OPEN 1,1,0,I$
7540 FOR C=1 TO 20
7550 INPUT#1,Q$(C) :REM QUESTIONS
7560 INPUT#1,A$(C) :REM MULTIPLE ANSWERS
7570 INPUT#1,B$(C)
7580 INPUT#1,C$(C)
7590 INPUT#1,D$(C)
7600 INPUT#1,R$(C) :REM CORECT ANSWER
7610 NEXT C
7620 CLOSE1
7630 RETURN
```

Lines 7500-7630 The 'load' routine allows you to load in a series of questions and answers you've saved to cassette.

ACTION REPLAY

No. of players | Joystick | Joystick optional | Cassette | Disk



Our resident gamesters, Steve Malone *and* Pete Connor, *tackle all that's new in Commodore 64 games software.*

You could put it down to hardening arteries or perhaps premature senility, but it does seem that the quality of games software is improving. A frightening thought, eh? The reason could be that it's finally dawned on software companies that they're not going to flog everything that's 'churned out' these days — rather, all new products need a modicum of effort and originality to back them up. However, of course, that's not always the case . . . which brings us to the 'best of the rest' — the games that didn't quite make it to the larger reviews. Hold on to your joysticks and here we go . . .

Take *Star Ranger* . . . please! This game is produced by a not inexperienced software house you may have heard of — Commodore. Dressed in the same sort of packaging as *International Football,* the unwary may consider that they're on the verge of buying something special. What you're really getting is an arthritic adaptation of *Galaxians* — with only three or four aliens on-screen at any one time — which lumber around ponderously until you put them out of their misery. A shocking game.

Also from Commodore, there's *Wizard Of Wor*. Now here's a funny thing. This is touted as a 'new' release,but the title page says 'Copyright 1980'. And what's more, it shows! *Wizard Of Wor* is one of those 'blast the aliens in the maze' games that probably had the punters swooning with delight when it first rolled off the production line but, as they say, the times they are a'changing.

Another runner in Commodore's gold watch stakes is *Gorf*, a title that sounds a little like someone 'laughing down the toilet'! This isn't one game, but several little ones stuck together, and the first is just a version of good old fashioned *Space Invaders*, the others are the sort of production line 'shoot-'em-ups' that we've come to expect from the 'cheapies'. Complain to your MP.

Looking through the other hand me downs on the rummage stall, there's *Rock'n' Bolt* from Activision. The idea here is that you've got to create a tower block, using bolts and girders, from the blueprint displayed at the bottom of the screen; if there is no blueprint displayed, you make it up as you go along (which explains a lot about the policy used to design the tower blocks in the UK!). It seems like a pretty good game, until you encounter the dumb sprites and block graphics. Not bad, but not rivetting (geddit?).

SUPER HUEY UH-IX
US Gold/£11.99

Steve Just recently there's been a deluge of 'realistic' flight simulators. Software houses have vied with each other to provide you, the customer, with all manner of knobs and controls to play with. However, most of these games involve high performance jet fighters . . . whereas this one's based on a helicopter.

The Huey was a helicopter that first achieved fame in the Vietnam war and, more recently, in such films as *The Killing Fields*. However, this is *Super Huey* — an experimental new version! In other words, US Gold's programmers have taken the opportunity to add a few extra buttons that aren't on the original — but what the heck!

Like most of these games, there are four levels of play, which means that you can get the hang of the controls before you start doing anything serious . . . like starting a fight with somebody!

The game certainly appears to be realistic (but then again what do I know?). For instance, instead of just lifting off, you have to rev the motor to the correct speed, engage the rotors and then take off. Once in the air, you can potter around the countryside — and quite pretty it is too, with scrolling towns, trees and the like.

Despite the fact that I'm sure we're all getting a trifle bored with flight simulators with endless banks of controls, this is certainly one of the better games around. At least I managed to keep my nose out of the ground!

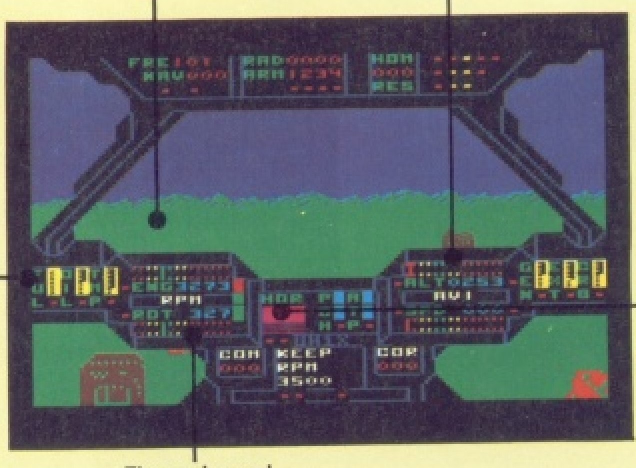
Pete Don't be daunted by *Super Huey's* lengthy instructions — this is the only flight simulator that's got me off the ground in less than two days!

Thanks to the Huey's sophisticated on-board computer you're up and whirling in no time at all, swooping and climbing over a very attractive red terrain that's dotted with all sorts of colourful trees and buildings. Despite having two different functions — cyclic and collective — on the joystick, control is pretty straightforward. I must admit, though, that hovering is still beyond me.

Complete with the training program *Solo Flight, Super Huey* gives you the chance to go into combat, rescue stranded folk in mountainous country and even try your hand at map-making. The graphics are excellent, as is the whirring noise of the engines and the boom of your machine guns. This is one flight simulator you won't want to crash-land!

Although the view from the cockpit is not terribly detailed, there is more to it than in most such simulation games

The altitude and speed controls are given here. By a process of deduction you'll notice that the Huey is hovering in mid air.

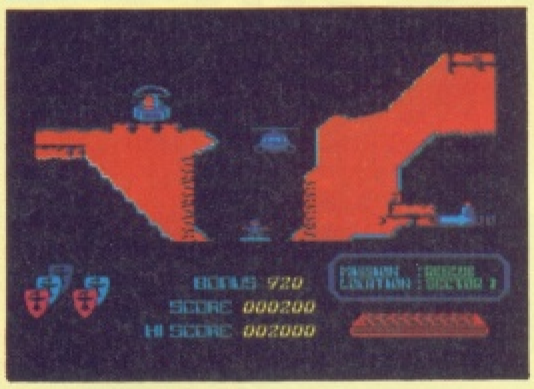


The amounts of fuel and oil remaining are shown in these gauges. Unless you intend to do a lot of sight-seeing you shouldn't have too much trouble here.

The artificial horizon allows you to keep a level head while all about you are losing theirs.

The engine and propeller rotation have to be revved to the correct speeds otherwise you'll either stay on the ground and look foolish or worse — stall.

AIRWOLF
Elite/£7.95



Steve It may not have escaped your attention, but just recently helicopters seem to have taken over from jet aircraft as the vogue machine to fly in the arcade stakes — and here's yet another . . .

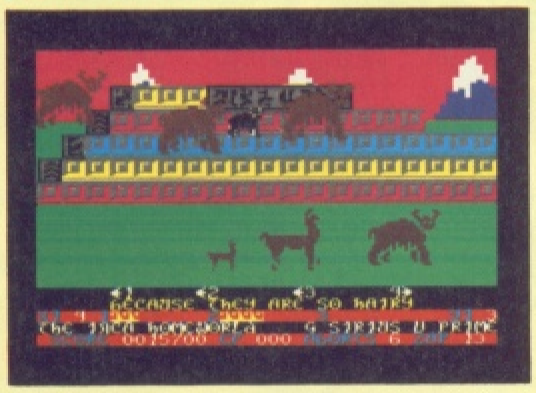
Like *Fort Apocalypse*, which won the game of the month a while back, *Airwolf* is based around the dodgy proposition of flying a chopper in underground caverns. And, when it comes down to it, *Airwolf*'s a better game; whereas *Fort Apocalypse* was just a good old 'shoot-'em-up', *Airwolf* requires you to *think* about what you're shooting at. For example, to get out of the first section, you've got to blast the right thing before a door will open to let you out.

The graphics are very nice and well detailed — a special mention should go to the helicopter itself that's made up of multi-coloured sprites. As far as movement goes, it must be said that the chopper's not the easiest beast in the world to control — a slight nudge on the joystick will send it careering off all over the place — but at least you're not dumped out of the game each time you bang your head on the ceiling of the cavern!

The fire button spits plentiful amounts of death, which is useful when you don't know what you are supposed to be firing at. The best tactic to employ is to quickly shoot everything in sight!

Pete This was a pretty good game on the Spectrum, but it's even better on the 64! Graphics and sound are both excellent, and this version's much harder to play than the Spectrum original. Getting out of even the first cavern will make you feel that you've accomplished something!

MAMA LLAMA
Llamasoft/£7.99



Pete After the spaced-out light show of *Psychedelia*, Jeff Minter bounces back to 'reality' to give us 'some good honest zapping .

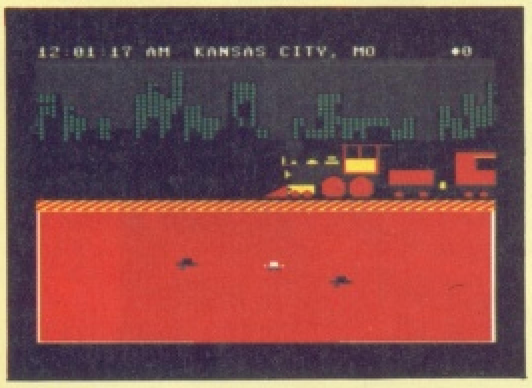
The game's similar to *Revenge*, but this time instead of camels, you've got to guide Mama Llama and her two little ones through lots of weird and wonderful waves of attackers.

But there's no linear progression. You select the wave you want to start at and the various levels of play from the strategy grid at the beginning, and off you go. It's a very clever and colourful idea that works well; it's also well beyond my capabilities to explain here . . . so check it out yourself.

For purposes of destruction, you control a 'killdroid', a sort of throbbing hamburger that hovers over the llamas. 'Droid response is full-inertial', says Jeff, meaning that it's hard to control at first, but you soon get the hang of it. The attack waves have great titles like 'Because they are so hairy', 'Evil eyes' and 'Colourspace Vortex', and contain critters of similar strangeness. Great Stuff! As always, both graphics and sound are superb. The quality of this program makes it a must for all his fans. Highly recommended.

Steve More woolly-minded antics from Llamasoft. I remember the days when the company used to turn out attractive little brainless 'shoot-'em-up's. These days you have to work out the icons, waves, patterns and who knows what else just to start playing the game! Once you've sorted out what levels and so on you want to play, you get the attractive, brainless 'shoot-'em-up' I was expecting from the beginning. OK though.

AGENT USA
Longmans Software/£7.99 Cassette, £14.95 Disk



Pete Boring graphics, minimal sound and simple gameplay. So what is it that makes *Agent USA* one of the most enjoyable games I've seen in a long while? It can only be compulsiveness, because there's precious little else to recommend it!

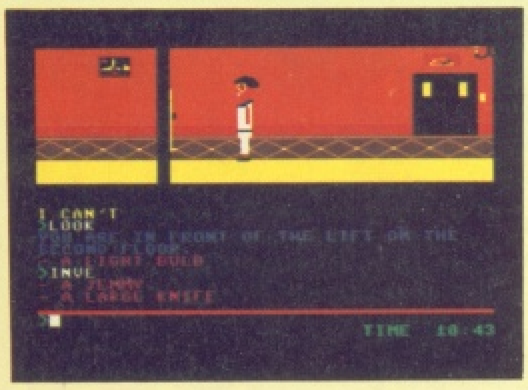
As a secret agent, you've got to travel through the US of A in an attempt to destroy the FuzzBomb which is turning the honest and dishonest citizens alike, into mindless Fuzzies. It's a little like the theme of *Invasion of the Body Snatchers*.

The bomb has been formed by extra-terrestrial crystals, and contact with a crystal will turn fuzzed citizens back into good ol' Reagan-voters. You have ten crystals to start with and the idea is to grow them, by planting them in a quiet spot; you need 100 crystals to eventually destroy the bomb. Of course, it's not so easy as you're always being pestered by citizens who won't leave you alone for a minute. It's heartbreaking when they gobble up the crystals you've so lovingly tended.

Agent USA is great fun and, at the more difficult levels, is very hard to crack. What's more, you can even pretend it's educational — you'll certainly learn a lot about the geography of the United States.

Steve Subtitled "If this is Tuesday it must be Chicago". This appears to be one of those 'hey-let's-educate-the-kids-while-they're-not-looking' packages — the object being to sort out the location of American cities while playing an arcade/adventure. Not bad, but it does get a bit tedious after a while and, knowing the site of Albuquerque is hardly going to stop someone becoming a Government artist (ie. drawing the dole!)

GRAND LARCENY
Melbourne House/£7.95



Steve Someone with a crueler streak would probably suggest that the title of this game shows the development of a healthy streak of honesty in software houses. Far be it from me, though, to say that the title summarises the contents. But it must be said that *Grand Larceny* is without doubt the lousiest action/adventure game I've ever seen.

Coming from Melbourne House (who should be ashamed of itself) the format of the game is similar to that of *Zim Sala Bim*. Basically, this means that you're in an on-going adventure situation, but you can move your character around with a joystick, cutting out all that usual 'Go North' nonsense. But herein lies the problem . . .

While *Zim Sala Bim* wasn't exactly *Galaxians* in the joystick stakes, the hero did at least make reasonable progress in getting from A to B and you could always admire the scenery in the process. *Grand Larceny* has none of this. The speed of movement is painful to watch (it has to be written in Basic) and the graphics design is simply awful. Perhaps, the game's been released to encourage us gamesters to write our own games?

The adventure itself is bog standard, and not helped by the fact that by the time you get anywhere you've forgotten (or lost interest in) why you came!

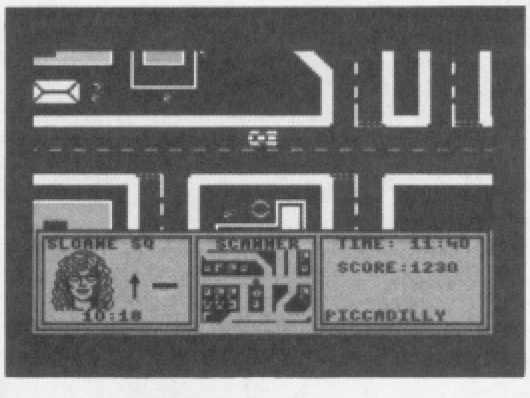
Pete The funky music was very nice, but the rest of the game didn't really match up to it. The graphics were grim; our hero has an apoplectically red face and the animation is terribly jerky. The game falls between being an adventure and an arcade game, and ends up as neither one thing nor another.



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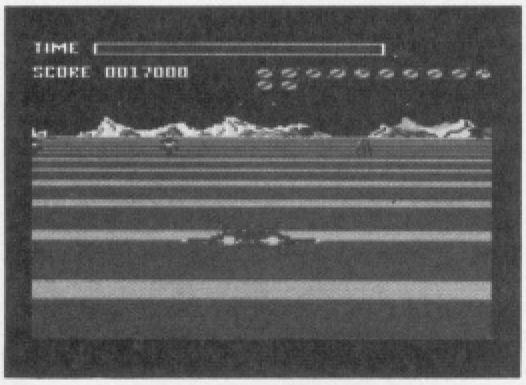
Pete The old Wing's song, *Band On The Run* plays constantly throughout this game. It's an appropriate choice, (even if it does get on your nerves pretty quickly) because that's what this one's all about — a band on the run. As Paul McCartney (Yeah, yeah, yeah! Ed.), you've to recover the last track from the stolen master tape of your latest LP. And if you don't get it back, the evil financier Rath will 'do the dirty' and you'll lose all rights to the record.

The trouble is, you can't remember the tune . . . so, the only thing to do is re-construct it by catching up with all the other members of the group and making them re-do it all. You end up rushing around London trying to meet your old band as they emerge from various tube stations; you're provided with a tube and road map, and information about each band-member. If you manage to complete the tune within the set time limit, you've then got to get back to the studio and mix it.

Screen display is very good, with pretty pictures of London landmarks wherever you go. Steering your car seems a lot easier with the keys (rather than the joystick) and, overall, the game's got a lot of obvious similarities to *Ghostbusters*. Still, if you prefer strategy to action, and you're game for a challenging puzzle, then check it out.

Steve Supposedly based on the film (which I haven't seen), you've got to track down the bits of the title tune from the various members of the band. And, as you know the band's 'habits' you know where to find them. Not, as you might think, the all night bars of Soho, but (of course) theatres, health parlours and flash restaurants(!). For un-reclaimed Beatles fans only.

BUCK ROGERS
US Gold/£9.95



Pete Buck's getting a bit long in the tooth these days — Sega brought him out way back in '83, if anyone remembers that far — you'll find his latest foray still pretty good value if you're an aficionado of the '3D zap 'em' type game.

Essentially, you have to blast your way along the surface of a planet, blast into deepest space, blast some space ships, blast an even bigger space ship and then go back to the planet where you can blast your way through the whole business all over again. Got the picture? Unsophisticated, but simple pleasures do have their attractions.

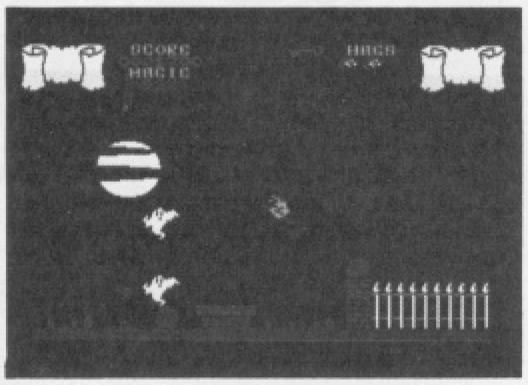
The first stage is rather like a space slalom, as you whizz through a number of gates on the surface. After that, you go through them again but now trying to shoot what look like oddly-shaped sputniks and malevolent pogo-sticks.

In outer space, things are a bit more sedate; you'll be familiar with the action from a thousand other 3D 'shoot 'em-up's. The graphics are OK, but they are beginning to show their age (although it must be said that the 3D effect is very convincing). Your ship responds well to joystick control and there's little frustration when it comes to aiming your lasers. Good, wholesome on-screen violence.

Steve From the usually classy US Gold, *Buck Rogers* looks remarkably like one of the Quicksilva potboilers that get reviled in this column from time to time. Perhaps the yanks are finally running out of steam?

At the lowest level the game is boringly easy. The trouble is, the higher levels include the same scenario so that by the time the action gets interesting you're bored by the rest of it. Just a way of making a fast buck I s'pose!

CAULDRON
Palace Software/£7.99



Steve This month's arcade contender for the 'Golden Goblin' award is *Cauldron*, and it's no easy matter to become queen of the witches. The ingredients for the spell you're looking for don't just turn up on the doorstep, you've got to get on your broomstick and go look for them.

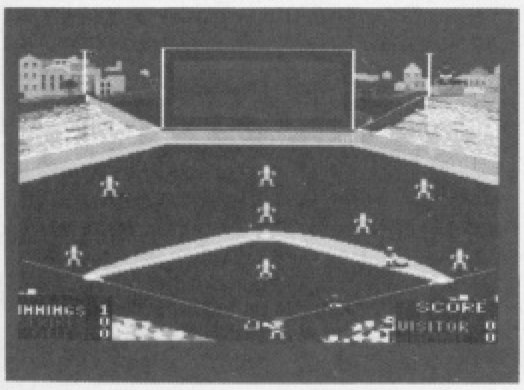
It's funny, but games of this sort always seem to be written rather better than yer average SF alien basher. *Cauldron* involves great attention to detail in the graphics, often missing from the average *Defender* clone; here, the sprites and background graphics are prettily constructed which makes the game a delight to look at.

Starting off in the witch's house, you leap on to your broomstick and it's up, up and away! Naturally, destroying the assorted bats and pumpkins scores points, but if they hit you, your magical power decreases. Once you've flown about a bit, you can always pop into one of the caverns and here the action reminds you a bit of *Jet Set Willy*.

An added bonus to this game is that the programmer has a sense of humour (something that's sadly lacking in a lot of games). The way the instructions are written at the start, and the on-screen portrayal of the witch tumbling out of the sky when she runs out of magic, should bring a smile to even the most jaded of games players.

Pete The graphics are bewitching, with a clarity and charm I've rarely seen on the 64. I thought I'd really enjoy it. But I didn't. I just couldn't get the hang of flying and landing, no matter how hard or long I tried. I think this game needs one or two more spells to make it a cracker.

WORLD SERIES BASEBALL
Imagine Software/£7.95



Steve Imagine Software, the company that went bust so spectacularly last year has been patched up and thrown back into the fray, and it's first offering is *World Series Baseball* (or rounders as my old games master used to call it).

As you can imagine (tee hee), you control a baseball team and your task is to score more runs than the other side. When batting, you've got the choice of hitting the ball hard, slow or medium, and pressing the fire button at the right time gets your man connecting ball to bat. My first innings were pathetic! But then it dawned on me that the big video screen at the top wasn't there for decoration and it's that you've got to watch (and not the field) if you want a chance of hitting the ball. Once you've actually hit the ball it's easy — your man runs to first base automatically.

Likewise, when your team's fielding, you've got the choice of height and speed of any throw. However, after a few throws I found some were not allowed . . . when I tried a fast low shot, the computer came up with the message 'BALL'. At first I thought this was a comment on my playing, until I realised the computer was trying to tell me that you mustn't aim at the batter's softer parts!

All in all, *World Series Baseball* isn't bad . . . in fact, it was much better than I expected. But it's hardly a 'MegaGame' is it lads?

Pete It takes some time to work out the rules of this game, despite its similarity to Rounders, because Imagine hasn't provided all the necessary instructions. However, once you get the hang of it, it's quite good fun. The graphics are excellent, even if the figures do seem to be a bit porky for athletes.



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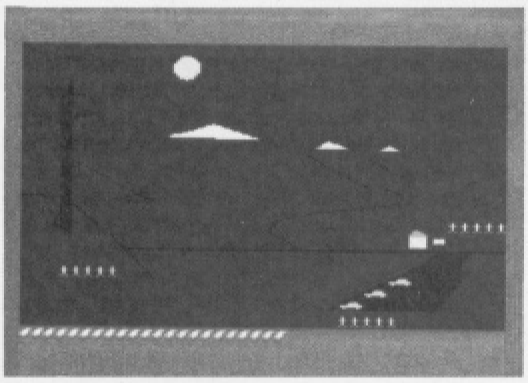
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OSPREY
BES/£9.95 Cassette, £11.95 Disk



Pete The osprey is an endangered species, and if this program's anything to go by, the computer game will go the same way.

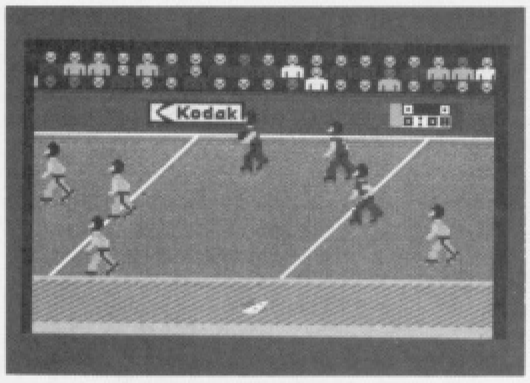
The idea is to protect the bird in its breeding grounds — a remote and beautiful part of Scotland. You're in charge of the wardens and must allocate them to various tasks, such as preventing egg-stealing and making people aware of ospreys. And that's it! At the beginning of the game you get to choose how many wardens will do what, and then you just sit back and wait for the consequences; these are shown in very pretty graphics, with green, snow-capped peaks and a deep blue lake.

But it's hardly thrilling. My most exciting moment came when I was told that 'Norwegian ospreys have luckily migrated to Scotland'. Watching stick-men shinning up trees to steal eggs isn't much fun either. Now if you had a shotgun....

Hailed as 'a masterpiece' by one misguided magazine, this game teaches precious little about ospreys and offers even less in the way of gameplay. Even the most avid ornithologist (bird fancier to you lot) wouldn't be able to muster a spark of enthusiasm for *Osprey*. It comes with an informative and nicely illustrated booklet — but that's not really what you want from a game, is it?

Steve Here's a game that aims to make you aware of how important it is to look after our ospreys. Trouble is, no-one's going to play the game unless they're told to in a Natural History class. The graphics are decent enough, but you're not going to get excited just juggling your warders around. I'm afraid this one gets the bird from me!

ROCKET BALL
IFK Software/£7.95



Pete If you're into a bit of violent sport — full-contact karate or bare-knuckle boxing perhaps — then *Rocket Ball* may be the 'sports' simulation you've been pining for.

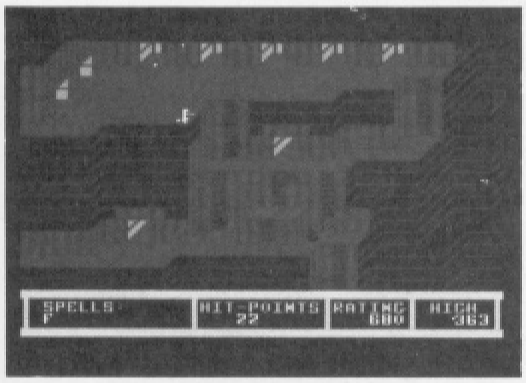
Imagine a version of Commodore's *International Football* where the fouls are more important than scoring goals and you're getting near the principle of *Rocket Ball*. It's played with two teams of five roller-skated players on a circular track — the ball has to be picked up and goals are scored by hitting a magnetic disc attached to a board.

But scoring goals is by far the least enjoyable part of the game — the main idea here is to do as much damage to your opponents as possible. You can bump, kick, ram or punch just about anyone you feel like. Controlling the players takes some practice, but repays the effort. The graphics aren't as smooth as those in *International Football*, but they're certainly clear enough and the players are well-animated.

This isn't a game for the faint-hearted but for those of a more aggressive nature, you'll have lots of fun playing against your friends(!).

Steve This game is a sort of cross between rugby and *Rollerball*, so if you're a fan of either of these there's a fair chance you might enjoy it. The object of the game is to score lots of goals and, in the meantime, thrash the opposition. Needless to say, I had enough trouble trying to find my players, let alone play the game. Once I'd found my players I still had difficulty in actually playing the game. To be fair, though, it does seem the sort of game that you only get good at after about three months practice. See you in about three months — if I'm lucky!

REALM OF IMPOSSIBILITY
Ariolasoft/£9.95 Cassette. £12.95 Disk



Steve It would appear that yet another wizard has stashed some treasure in his castle and, as always, it's your job to rescue said baubles (which shall hearafter be referred to as the Seven Crowns of Middle Earth) from the 13 dungeons they've been locked in. It's hard work being the good guy!

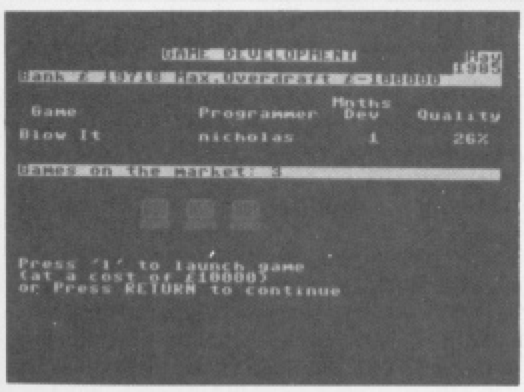
Realm Of Impossibility is a sort of cross between *Lode Runner* and *Ant Attack* . . . with a few adventure-type spells thrown in for added spice. The idea is that you've got to guide your little man through various 'Cecil B Demille'-type dungeons to get to the keys and spells and so on, that get you (eventually) to the dungeons where the crowns are. Naturally, the wily ol' wizard wouldn't be a fully paid-up villain if he hadn't left all manner of snakes, zombies and pink blobs to guard the dungeons.

In order to get in and out of the dungeon alive with the key or whatever, you have to run like fury to avoid the nasties. One way to success is to slow the creatures up by liberally spreading a number of magic crosses behind you (which they can't cross) or by chucking one of your spells around to freeze them.

The game is run at a hectic pace and, when you finally make it out of a dungeon with a key clutched in your hot, sweaty palm, you'll feel good . . . good and exhausted!

Pete I rather liked the abstract nature of the different scenes in this game and their strange perspective. I couldn't decide whether the horrid, formless creatures were a clever attempt at something nightmarish ... or just bad graphic design. *Realm of Impossibility* is a fairly mediocre game, but should provide some enjoyment.

SOFTWARE STAR
Addictive/£7.95



Steve Picture, if you will, the scene at Addictive Software: Programmer: "I can't think of anything to write about, boss." Boss: Of course you can, my boy. There are hundreds of subjects. Write about something you know about." Programmer: "But, boss, since you had me chained to this 64, I never see anything but the inside of this software house." Boss (irritated): "Then write about that then!"

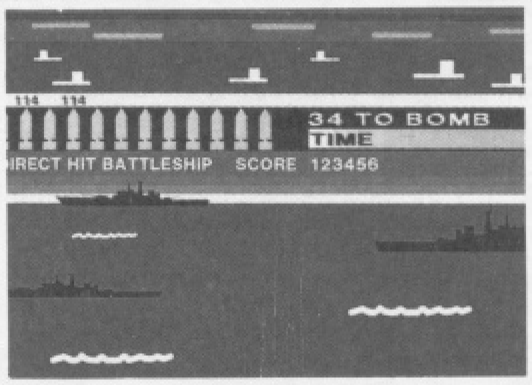
The resulting game, *Software Star*, comes to you from the man that brought you the popular *Football Manager* and, as you might expect, is a similar sort of simulation. The trick is to crack the whip with the programmers, keep a high profile and make sure the new games are rolling off the production line while culling those that have outlived their usefulness. Big money can be made by having a hit game, but you can lose your shirt on one that bombs.

Despite the fact *Software Star* had me completely absorbed I'm not sure it's up to the high standards of *Football Manager* . . . but then Addictive has to keep those games a-coming like everyone else.

How did I do? Software houses will be happy to hear that I lost several hundred thousand pounds!

Pete I really enjoyed making £72,000 profit in my first year, instead of the 10,000 target the directors had set me. And, I even managed to make two number one hits as well! But of course, things went rapidly downhill after that. *Software Star* hasn't quite got the addictiveness or complexity of *Football Manager*, but it's pretty gripping stuff all the same.

STARFIRE/FIRE ONE
CBS/Epyx/£8.95 Cassette, £11.95 Disk



Steve Now, here's a new trend I like — putting two or more games on a single tape. Admittedly, (with the exception of the very wonderful Soft-Aid cassette) the software houses aren't falling over themselves to bundle their best games together.

The first game is *Starfire*, a three dimensional dogfight in space affair. I've seen it before and you've seen it before, but this turned out to be one of the better versions. *Starfire* won't win any prizes for its graphics, but the scrolling is smooth and believable and it's easily controlled.

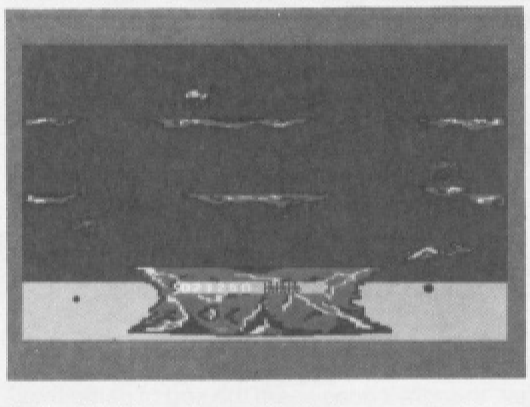
I must admit that for the first few minutes I actually enjoyed jetting through outer-space zapping enemy starships, but then I got that 'I've done this before' sensation in the pit of my stomach and the feeling of pleasure was rapidly replaced with boredom.

Fire One sounded as though it was going to be a strategy game. Actually, it's more an 'arcade with a brain', along the lines of *Beach Head*. Your mission is to sink an enemy fleet from a submarine before they sink yours. That's it — shoot anything else, and it won't help you win, just add to your high score.

I wouldn''t have let these games off so lightly, if they were sold singly, but together they make quite a nifty little package. You won't find the excitement of overloading the heart, but you could do a lot worse.

Pete Even though there are two games on the tape it still doesn't seem worth having. *Starfire* is a boring and archaic 3D 'shoot-'em-up' with terrible burbling noises, while *Fire One* is a boring and archaic 'sub' game with terrible gurgling noises. I don't mind if this package ends up in space.

JOUSTE
IFK Software/£6.95



Pete Well, here's an idea that seems to have been around in computer games since at least the Middle Ages: the jousting knight, seated on his trusty steed, fighting off evildoers with his fearsome lance. So, what have we got here . . . a new cliché?

Jouste sports a very 'futuristic scenario' — something you'll believe when you spot the heroic knight riding a very large buzzard that flies around the screen taking on all sorts of creeps, including Lava Trolls and an invincible Pterodactyl!

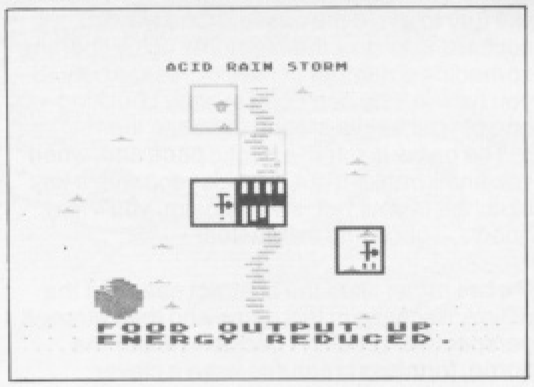
Obviously, jousting of this nature requires the winner to be the knight whose lance is highest; this means there's a fair amount of button-pressing to keep the buzzard's wings flapping. Luckily, though, there are a number of platforms to rest on, that can also be used to zoom up or swoop down on your unsuspecting enemies.

As well as jousting, you've got to keep an eye out for the eggs your adversaries drop — and crush them before they hatch more evil. A nice touch is the huge hand which sometimes reaches out of the water to grab your mount.

This ancient and venerable idea is unlikely to strike many gamesters as very exciting. But if you fancy some nostalgic lance-to-lance combat, at least it's been programmed well.

Steve I think I might be missing something on this one. I mean, I get the idea and everything, but I can't understand why everybody else's ostrich can fly and mine can't. Because of this, the game is weighted far to heavily in favour of the computer — a criticism that can be levelled at a number of software titles on the market at the moment. It only goes to show there's no joustice in the world of games.

MULE
Ariolasoft/£11.99 Cassette, £14.95 Disk



Steve Another American import which involves something called the *MULE* (which stands for Mutli User Labour Element — the all-purpose robot workhorse of the future). The scenario of the game is that you and three other unfortunates have been dumped on a planet and left to get on with it.

So far, it all sounds like a typical sort of science fiction projection, similar to Beyond's *Psychon*. Well, not exactly. What *MULE* actually does is re-kindle the pioneering spirit so beloved of Ronald Reagan.

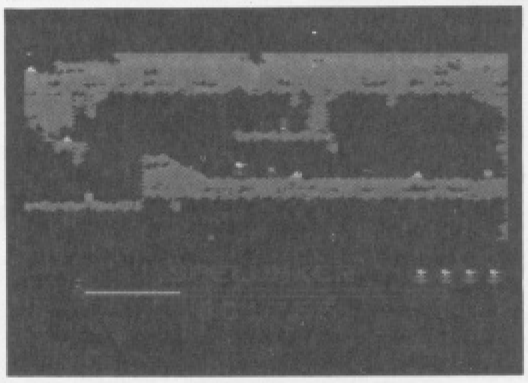
The trick of the game is that you and the other players get given plots of land and, in order to survive you've got to have sufficient quantities of 'Smithore', energy and food. If you can corner the market in one of these commodities, you can then make your fellow pioneers pay through the nose for it. (In a fit of capitalist zeal at one point I managed to make one poor blighter pay four times the normal maximum price for energy — and what's worse is that I felt good about it!).

To get hold of the choice pieces of land, you've got to press the joystick button before anyone does. This is virtually impossible when playing the computer at the higher levels but, luckily, the machine remains just a stupid as it is on lower levels when it comes to buying and selling.

Despite, the insidious work ethic propaganda behind the game it had me thoroughly hooked. Recommended.

Pete It wasn't at all bad being a Bonzoid and taking on the computer in a game that seems designed to inculcate the values of thrusting entrepreneurialism. With two or more humanoids it could get very interesting.

SPELUNKER
Ariolasoft/£9.95 Cassette, £12.95 Disk



Pete Ariolasoft have made something of a name for themselves by bringing out a large number of very *old* American games. *Spelunker* is no exception, materialising from the almost prehistoric era of 1982! I've never understood why software houses persist in bringing out these relics from the past hoping they'll become popular.

Spelunker is a venerable caverns and ropes game; 'Treasures of inestimable worth, etc.... traps and barriers, restless ghosts of spelunkers who lost their way...' all await you if you take on the challenge.

You descend in a convenient elevator and potter around the caverns, trying to collect batteries for your phantom blaster, dynamite for obstructions, keys, treasure... and so on. Frequently a cute ghost will waver along and turn you into a spirit — if you're not quick with that blaster, that is!

The game really looks its age, with blurry graphics and little in the way of sound. It's by no means terrible — just one of those games it's very hard to find anything to enthuse over. Seasoned gamesters will surely find it too simple to keep them interested.

Steve Brøderbund produced some of the better games that have appeared over the last few months. I wasn't struck by this one even though it's got all the qualities of their previous efforts. For a platforms and ladders game (and that's all it really is), it wasn't nearly fast or awkward enough for my taste. The tiny figures that have appeared to such good effect in previous games are lost in *Spelunker*, and what's worse, no use is made of the split-pixel positioning that's so much a part of the fun in these games.



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•PART 2•

The Scribe

THE DATABASE

In the last issue of Your 64, Dougie Bern detailed an interpreter program you can use to create an adventure game with a difference ... and that difference is that you're in control! Join Dougie now in an adventure database that'll not only provide you with a scenario to baffle your friends, but also with a framework for you to follow when you write your first adventure program. It's quick and easy ... bring nothing with you, apart from your trusty 64 and a healthy imagination. Welcome to The Scribe.



If it's been your secret ambition to write an adventure program then this is your lucky day! Together with the program in last month's issue (*Y64*, issue 9), you are now holding the programming wherewithall to produce an adventure of your own making.

Do It Yourself!

The main problem with adventures is that they take so long to write. . .if you've got a month or two sometime, why not have a go? But, of course, that's why we're here and, more specifically, why *The Scribe* was written. Using the interpreter program given last issue along with the database given here, you'll be able to battle your way through a nine location scenario that takes you through a forest, by a fast-moving river, by snow-capped mountains, eventually leading you to an old, disused mine-working.

Well, if that doesn't sound so exciting, don't stop reading now. . .we've only just begun! We're not into the business of just giving you an adventure program — we're providing an unlimited number of adventures; all *you* need to do is to think of a scenario and it'll be a matter of a few minutes work to change the listing given here into something completely different.

And that's not the only thing. Once you've cracked a commercial program there's nothing to do except let the cassette gather dust on the shelf. With *The Scribe*, once someone's beaten one of your adventures all you have to do is alter a few variables, change a couple of PRINT statements and you've developed a whole new adventure!

Venturing Out ...

Although the adventure scenarios given here may cause a few problems for experienced adventurers, none of it's secrets will be held back for *Your 64* readers. So that you'll be able to fully understand each section of the database, we've had to spoil the adventure somewhat by telling you exactly what'll happen. But then, once you've typed it all in and read through the explanations of each part of the program, you'll be set to re-write and add to the database as it stands.

It is a long listing to type in (unless you're lucky enough to be able to access it straight off Compunet on the exclusive *Your 64* pages) but if you take it in stages, and read through the line-by-line analysis of each section, you shouldn't find it too much of a hassle. Once finished, and tagged on to the program given in the last issue (*Y64*, issue 9) type RUN and play the game a few times making sure you understand how and why everything works as it does.

The Adventure Continues ...

And if it's incentive you need, we've got it. There'll be a prize of ten software packages for the best adventure that's been written using *The Scribe*. All programs should be sent in by July 30th to *Y64* Adventure Competition, *Your 64*, 14 Rathbone Place, London W1P 1DE. We look forward to your entries flooding in ...

THE ADVENTURE DATABASE

Now you've typed in the adventure interpreter of *The Scribe,* let's move on to the database you'll need to play the game. Before we look at the game itself, though, here's a rough idea of what to expect over the next few lines of code.

The adventure database is divided into seven sections:

- A list of responses/messages.
- The location descriptions and location numbers.
- The EVENT$ table — the actions performed by the computer once you've given a command.
- The STATU$ table — the actions performed by the computer if certain combinations of events turn out to be true.
- A table of connections between locations.
- A dictionary of words recognized in the game.
- The objects recognized in the game, their descriptions and starting locations.

Each of these sections will be explained in turn, but first we'll have to create an adventure with which to relate these to.

First off, it must be stated that this isn't going to be a complex adventure — that'll be up to you to sort out! There'll be no secrets here as to what will happen . . . everything will be set out so that you have no problem beating the game — after all, it's the technique you've got to sort out!

Have a look at the map of the adventure given and, once you've sorted out what goes where, have a look at the various tables in the database and see if you can make sense of them.

MESSAGES AND RESPONSES

The messages and responses printed up on-screen during the adventure are stored between lines 3005-3151. The reason for each message may not be apparent from a quick squint through the print statements, but all will be clear once you've started playing!

To give you a rough example of how it all works, imagine that you're at location 3 (the Old Shack) and you've just typed in the command 'OPEN DOOR'. If you're carrying the keys, you'll get the message printed up from line 3005; if you've not yet collected the keys, you'll get the message from line 3010. (These messages are printed up only if the program can find a match for your command with the ones specified in the EVENT$ table).

The messages given in these lines are deliberately spaced, just in case you want to add a few descriptions to embelish the adventure given here.

```
3005 PRINT "THE DOOR IS OPEN.":RETURN
3010 PRINT "THE DOOR IS LOCKED.":RETURN
3020 PRINT "YOU ARE SWEPT AWAY AND DROWN
 IN THE FASTFLOWING RIVER.":RETURN
3030 PRINT "THE ROAD BENEATH YOU CRUMBLE
S AWAY AND"
3032 PRINT "YOU PLUNGE DOWN A DEEP GORGE
 TO A"
3034 PRINT "BLOODY DEATH ON THE JAGGED R
OCKS BELOW."
3036 RETURN
3040 PRINT "I'SS ALREADY LIT BOSS.":RETU
RN
3050 PRINT "YOU'S JUS' BLOWN Y'RSELF T'
BITS BOSS!!":RETURN
3060 PRINT "TH' DOOR'S LOCKED BOSS.":RET
URN
3070 PRINT:PRINT "WELL DONE BOSS, Y'S MA
NAGED TO BURN"
3072 PRINT "DOWN THE DOOR.":RETURN
3080 PRINT "YOU'S BETTER STOP WASTIN' MA
TCHES BOSS"
3082 PRINT "WE'S GONNA NEED THEM.":RETUR
N
3090 PRINT "THA'S A NICE FIRE BOSS, BUT
A AIN'T COL'":RETURN
3100 PRINT "A'S SORRY BOSS, BUT A CAN'T
HELP Y'.":RETURN
3110 PRINT "TH' DOOR'S OPEN BOSS.":RETUR
N
3120 PRINT "Y' AIN'T GOT THE KEYS BOSS."
:RETURN
3130 PRINT "YOU'S BUST THE KEY IN THE LO
CK BOSS.":RETURN
3140 PRINT "THE SIGN SAYS :- DANGER! ROA
D CLOSED.":RETURN
3150 PRINT "HORDES OF HUNGRY WOLVES EMER
GE FROM THE DARKNESS AND TEAR YOU TO ";
3151 PRINT "PIECES.":RETURN
```

LOCATION TEXTS

```
3505 PRINT "YOU ARE STANDING ON A DIRT R
OAD NEXT TO"
3506 PRINT "A FAST FLOWING RIVER. TO THE
 EAST IS AN IMPASSABLE MOUNTAIN RANGE."
3507 PRINT "THE ROAD LEADS NORTH AND SOU
TH.":RETURN
3510 PRINT "YOU ARE NEXT TO THE RIVER."
3511 RETURN
3520 PRINT "YOU ARE AT A JUNCTION ON THE
 ROAD."
3521 PRINT "EXITS LEAD NORTH,SOUTH,EAST
AND WEST."
3522 RETURN
3530 PRINT "YOU ARE AT THE JUNCTION."
3531 RETURN
3540 PRINT "YOU ARE IN A CLEARING OUTSID
E AN OLD"
3541 PRINT "WOODEN SHACK. THE SHACK LOOK
S AS IF ITS"
3542 PRINT "BEEN ABANDONED FOR A WHILE."
3545 RETURN
3550 PRINT "YOU ARE OUTSIDE THE SHACK."
3551 RETURN
3560 PRINT "YOU ARE INSIDE THE SHACK."
3565 RETURN
3570 GOTO 3560
3580 PRINT "YOU ARE IN AN OLD STONE QUAR
RY. THE"
3581 PRINT "ONLY EXIT APPEARS TO BE BACK
 WEST."
3585 RETURN
3590 PRINT "YOU ARE IN THE QUARRY."
3591 RETURN
3600 PRINT "YOU ARE IN A DARK DENSE FORE
ST.":RETURN
3610 PRINT "YOU ARE IN THE FOREST."
3611 RETURN
3620 PRINT "YOU ARE AT A FORK IN THE ROA
D. THE FORK"
3621 PRINT "TO THE WEST IS BLOCKED BY A
SIGN, THE"
3622 PRINT "OTHER FORK LEADS SOUTH."
3623 RETURN
3630 PRINT "YOU ARE AT THE FORK IN THE R
OAD."
3631 RETURN
3640 PRINT "YOU ARE OUTSIDE AND OLD MINE
 WORKING,"
3641 PRINT "THE ENTRANCE IS SEALED BY A
THICK "
3642 PRINT "WOODEN DOOR AND A HEAVY PADL
OCK."
3643 RETURN
3650 PRINT "YOU ARE OUTSIDE THE OLD MINE
 WORKING."
```

```
3651 RETURN
3660 PRINT "YOU ARE INSIDE THE MINE WORK
ING."
3661 PRINT "HOPEFULLY YOU SHOULD NOW UND
ERSTAND HOW"
3662 PRINT "THE ADVENTURE INTERPRETER WO
RKS AND    "
3663 PRINT "SHOULD BE ABLE TO PRODUCE YO
UR "
3664 PRINT "OWN ADVENTURES."
3665 RETURN
3670 GOTO 3660
```

The descriptions of all the locations are given in lines 3503-3670. There's no particular reason for them to be located here and if you need room for more locations, then you can place the data anywhere you want; if you do move this section, remember to alter the line numbers given in line 2450 (for the descriptions) and line 2600 (for the text messages).

You'll find that there are two types of description given in the adventure — there's a full description for those who are visiting a particular location for the first time, and a smaller explanation if you're just passing through. For example, if you're visiting location 5 (the Old Quarry) for the first time, you'll get the full 'YOU ARE IN AN OLD STONE QUARRY. THE ONLY EXIT APPEARS TO BE BACK TO THE WEST' message. However, if you've been there before, all you'll get is the slightly diminished response 'YOU ARE AT THE QUARRY'.

One last thing to note is that, although there are 10 locations in all, only nine are numbered. This is because the Deep Gorge doesn't exist as a location, but only as a mention in the EVENT$ table; check out the EVENT$ table for more details.

SETTING UP

```
10005 LET ACTNS=44  :REM TOTAL NO. OF ENT
RIES IN THE EVENT$ TABLE.
10010 LET SSTAT=5   :REM TOTAL NO. OF ENT
RIES IN THE STATU$ TABLE.
10015 LET LNCS=9    :REM TOTAL NO. OF LOC
ATIONS
10020 LET WRDS=34   :REM TOTAL NO. OF WOR
DS RECOGNISED.
10025 LET TNOBS=7   :REM TOTAL NO. OF OBJ
ECTS.
10026 LET LCL=1     :REM LCL=LOCATION NO.
 (N.B. 1=START LOCATION)
```

Lines 10005-10026 This routine sets the size of the arrays (tables) for the data in the rest of the database.

```
10030 DIM EVENT$(ACTNS)   :REM EVENT TABLE
10035 DIM STATU$(SSTAT+1):REM STATUS TAB
LE
10040 DIM LOCAT$(LNCS)    :REM LOCATION C
ONNECTIONS TABLE.
10042 DIM VISIT(LNCS)     :REM VISIT FLAG
10045 DIM DICTN$(WRDS)    :REM DICTIONARY
10050 DIM OBJCT$(TNOBS)   :REM OBJECT DES
CRIPTIONS
10055 DIM OBJ(TNOBS)      :REM OBJECT LOC
ATIONS
10056 DIM FLAG(10):DIM COUNT(10):REM FLA
GS AND COUNTERS
10060 DIM INOBJ(TNOBS)    :REM START LOCA
TIONS OF OBJECTS.
```

Lines 10030-10060 Initialise the arrays for the data in the database.

These lines set up the size of each table in the database — so this is the area you'll be looking to alter when you come to writing your own adventures.

You may notice that there are two arrays that haven't been mentioned before — FLAG() and COUNT(). These are general purpose arrays, and you can assign them to whatever functions you require in your program.

In the micro-adventure given here, only the first four FLAG()s are used — and this is how they've been allocated:

- FLAG(1) This indicates whether or not the current location is dark — a value of one means it's dark, zero indicates that a torch has been lit. (It's value is tested at line 2405 to see if the location is light; if it is then the description will be printed.)
- FLAG(2) This is more specific to the torch itself; a value of one indicates that the torch is on, a zero value means that it's not. (This is tested in line 2410, and the location description is only printed if the torch is on.)
- FLAG(3) This flag is used to indicate if the door at location 3 (the Old Shack) is open; a one means that's it's been unlocked, a zero value shows it's still locked. (This is checked against the STATU$ table in the subroutine at line 1300.)
- FLAG(4) Like FLAG(3), this indicates the status of the door to location 8 (the Old Mine Working) — a one means that it's open, a zero value shows it's still locked. (This is checked against the STATU$ table in subroutine at line 1300.)

The other array, COUNT(), is set up in the following way:

- COUNT(1) This is reduced each time you enter a command (see line 2290). (This counter isn't used in the micro-adventure given here, but it could be used to print a message like 'Hurry Up!' if the adventurer is taking a bit too long to make a move.)
- COUNT(2) Have a look at line 2406 and you'll see that this array is reduced each time you move into a dark location.
- COUNT(3) This array is reduced each time you're in a dark location with an unlit torch (see line 2420).

To illustrate how the COUNT() array works, let's consider COUNT(3). This array is set to three if you move North to the Dense Forest (location 6) from the Junction (location 2) and you're not carrying a lit torch. Then, each time you move around in the darkness of the forest without lighting your torch, COUNT(3) is reduced by one, until it reaches a value of one and it's checked against the fifth entry in the STATU$ table — at this point, you'll be treated to an on-screen message informing you that you've been eaten by hordes of hungry wolves. The program then jumps to the end of the game.

THE EVENT TABLE

```
10066 FOR N=1 TO ACTNS
10067 READ DAT$
10068 LET EVENT$(N)=DAT$
10069 NEXT N
10070 DATA 0400101*A03Q*,2400101*A03Q*
10071 DATA 0400103503*G04E*,0400103603*A
02D*
10072 DATA 0400107*A04Q*,0200108604*A07D
*
10073 DATA 0200108504*G09E*,0100102201*M
01G06E*
10074 DATA 0200106502*N01G02E*,1318201*H
01B*
10075 DATA 1418401*I01B*,1318202*H02M02B
*
10076 DATA 1418402*I02N02B*,1319203*H03B
*,1419403*I03B*
10077 DATA 1320204*H04B*,1420404*I04B*,1
321205*H05B*,1421405*I05B*
10078 DATA 1322206*H06B*,1422406*I06B*
10079 DATA 1323106502207*H07B*,1323207*H
07B*
10080 DATA 1423407*I07B*,1518401*L01M02E
*
10081 DATA 1518202*A05B*,1500403206*A06Q
*
10082 DATA 1519403108205207*A08M04K05K07
E*,1519403*A09D*
10083 DATA 1521403108205207*A08M04K05K07
E*,1521203205207*A10K05K07B*
10084 DATA 1523403108205207*A08M04K05K07
E*,1523203205207*A10K05K07B*
```



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```
10085 DATA 1700*E*,2500*F*,2700*A11D*,28
00*P*,1629103503*A12E*,1629304*A13E*
10086 DATA 1629103204*M03B*
10087 DATA 1629108504*A12D*,1629108204*A
14D*
10088 DATA 3000107*A15D*,0100102602*M010
0304G06E*
```

Lines 10066-10088 contain the array EVENT$, which you will have met before as the EVENT$ table. Have a look at the condition and action codes you'll find there before returning to the text for a brief discussion on how to make use of this table to create your own adventure.

THE CONDITION CODES

Test made by the program	Condition codes
Is the player at location xx	1xx
Is object xx at the present location (or carried)?	2xx
Is object xx not at the present location?	3xx
Is object xx not being carried?	4xx
Is FLAG(xx) on (equal to one)?	5xx
Is FLAG(xx) off (equal to zero)?	6xx
Does COUNT(xx) equal one?	7xx

THE ACTION CODES

Action performed	Action codes
Print text message/response.	A
Print message 'OK BOSS'.	B
Scan STATUS$ table and get the next command.	C
Get the next command from the keyboard.	D
Print the room description, scan STATUS$ and get the next command.	E
Print list of objects carried.	F
Move player to location xx.	Gxx
Pick up object xx.	Hxx
Drop object xx.	Ixx
Drop object xx at current location (LCL).	Jxx
Destroy/remove object xx from the game.	Kxx
Swop objects xx and xx+1.	Lxx
Turn FLAG(xx) on.	Mxx
Turn FLAG(xx) off.	Nxx
Set COUNT(xx) to yy.	Oxxyy
Verify the 'Quit' command.	P
Quit the game.	Q

Now that you've seen the condition and action codes, let's have a look at the EVENT$ table itself. Entries for the EVENT$ table are constructed in the form:

K1K2CxxCxx*AxxAxxA*

Where: K1 and K2 are the codes obtained from the dictionary (DICTN$) that correspond with the words that were input; Cxx is made of C, the condition code that's to be satisfied, and xx, a parameter; and Axx is comprised of A, the action code of the action to be carried out, and xx, a parameter. Note that the first asterisk denotes the end of the conditions and the second asterisk shows the end of the actions.

How this works in practice is best illustrated by an example from the EVENT$ table . . . and then working through it, step-by-step. First, though, have a look at the EVENT$ table.

THE EVENT$ TABLE

Entry	Codes	Conditions	Actions
1	0400	101*	A03 Q*
2	2400	101*	A03 Q*
3	0400	103 503*	G04 E*
4	0400	103 603*	A02 D*
5	0400	107*	A04 Q*
6	0200	108 604*	A07 D*
7	0200	108 504*	G09 E*
8	0100	102 201*	M01 G06 E*
9	0200	106 502*	N01 G02 E*
10	1318	201*	H01 B*
11	1418	401*	I01 B*
12	1318	202*	H02 M02 B*
13	1418	402*	I02 N02 B*
14	1319	203*	H03 B*
15	1419	403*	I03 B*
16	1320	204*	H04 B*
17	1420	404*	I04 B*
18	1321	205*	H05 B*
19	1421	405*	I05 B*
20	1322	206*	H06 B*
21	1422	406*	I06 B*
22	1323	106 502 207*	H07 B*
23	1323	207*	H07 B*
24	1423	407*	I07 B*
25	1518	401*	L01 M02 E*
26	1518	202*	A05 B*
27	1500	403 206*	A06 Q*
28	1519	403 108 205 207*	A08 M04 K05 K07 E*
29	1519	403*	A09 D*
30	1521	403 108 205 207*	A08 M04 K07 K07 E*
31	1521	203 205 207*	A10 K05 K07 B*
32	1523	403 208 205 207*	A08 M04 K05 K07 B*
33	1523	203 205 207*	A10 K05 K07 B*
34	1700	*	E*
35	2500	*	F*
36	2700	*	A11 D*
37	2800	*	P*
38	1629	103 503*	A12 E*
39	1629	304*	A13 E*
40	1629	103 204*	M03 B*
41	1629	108 504*	A12 D*
42	1629	108 204*	A14 D*
43	3000	107*	A15 D*
44	0100	102 602*	M01 00304 G06 E*

With reference to the EVENT$ table, let's have a look at the ninth entry, which you'll see given as:

0200 106 502* N01 G02 E*

With reference to the table showing the conditions and actions, let's go through each constituent part of the above. The first part '0200' means South (the '00' part of the entry means that any word will do — see the Location Connection table) — if the codes from the input correspond to this code then the program checks out the rest of this entry. The condition part of the entry '106 502' asks whether we're at location 6 ('106') and is FLAG(2) on which'll mean that the torch is lit ('502').

Now, if both condition codes are satisfied, the program moves on to the action codes 'N01 G06 E'. Taking these one at a time, 'N01' means that FLAG(1) is reset to zero (which means that the location is now lit), 'G06' is a request to move to location 6 and, finally, 'E' prints the description and requests a new input from the adventurer.

THE STATUS$ TABLE

```
10210 FOR N=1 TO SSTAT
10220 READ DAT$
10230 LET STATU$(N)=DAT$
10240 NEXT N
10250 LET STATU$(N)="*D*":REM N.B. ADDED
 TO THE END OF THE STATUS TABLE
10260 LET SSTAT=SSTAT+1
10270 DATA 103503*A01D*
```

```
10280 DATA 103603*A02D*
10290 DATA 108504*A01D*
10295 DATA 108604*A02D*
10296 DATA 106703*A16Q*
```

The STATU$ table is a table of conditions that's checked by the program each time it goes around the main program loop. Similar to the EVENT$ table in many ways, the STATU$ table doesn't have keycodes at the beginning of each of its entries. If the conditions in any of the entries are fulfilled, the program performs those actions and then heads back through the rest of the table until it comes to the last entry 'D*', which is the action command to get a new input.

To better understand the STATU$ table, let's have a look at its first entry:

103 503* A01 D*

Looking first to the conditions, we have '103' which asks whether we've got to location 3 yet, and '503' to check if FLAG(3) is on (or in English . . . is the door open?). If both conditions are fulfilled, the actions that follow are carried out; in this case, 'A01' would mean that the first message (see line 3005) is printed and 'D*' waits for a new input.

THE STATU$ TABLE

Entry	Conditions	Actions	Entry	Conditions	Actions
1	103 503*	A01 D*	4	108 604*	A02 D*
2	103 603*	A02 D*	5	106 703*	A16 Q*
3	108 504*	A01 D*	6	*	D*

THE LOCATION CONNECTION TABLE

```
10310 FOR N=1 TO LNCS
10320 READ DAT$
10330 LET LOCAT$(N)=DAT$
10340 NEXT N
10350 DATA "0102020700","02010305040300"
10360 DATA "030200","030300","040200"
10370 DATA "01060306040600","0101020800"
10380 DATA "010700","00"
```

Lines 10310-10380 generate the connections between the locations you'll find in the micro-adventure given here. Each connection consists of four characters, the first two of which are the direction code (which are obtained from DICTN$ — the Dictionary table) and the second pair from the location number of the destination.

Again, to provide you with an example of how this table works, let's look at the entry for location 1:

0102 0207 00

Looking at the figures in the order they're given, '0102' means that if you want to go North you'll go to location 2, '0207' means a trip South will put you in location 7, and '00' signifies that there are no other options.

One other thing to note is that there is no entry for the Deep Gorge — this is because it's dealt with in the EVENT$ table. Also, you'll notice that the entry for location 6 always sends you back to location 6 — this is the equivalent to getting lost (finding your way out of location 6 requires a torch to be lit which is taken care of in the EVENT$ table).

THE LOCATION CONNECTION TABLE

Location	Connections	Location	connection
1	0102 0207 00	6	0106 0306 0406 00
2	0201 0305 0403 00	7	0101 0208 00
3	0302 00	8	0107 00
4	0303 00	9	00
5	0402 00		

THE DICTIONARY TABLE

```
10410 FOR N=1 TO WRDS
10420 READ DAT$
10430 LET DICTN$(N)=DAT$
```

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Using the step-by-step guide below, you should be able to write your own adventures efficiently so that, if you don't stray too far from the example program given here, are guaranteed to work. Obviously, you'll have to provide the imagination, and that can often be the most difficult part. The best thing to do is remember what you liked most about the plots of commercial adventure programs you've played before and try and use the same tricks. It's also worth recalling the frustrating times as well . . . and make sure your program doesn't put anyone off with shallow descriptions of the locations and the like. Adventures, above all else, should tax the mind.

The most important thing, however, is to enjoy yourself writing the adventure and to make sure it's fun to play! Bear it in mind . . .

1. Draw a map of your proposed adventure, marking in the location numbers and the connections between each location. Don't worry too much about your artistic skills — this is for *your* guidance only as you build up the scenario. Try a small adventure first off if you feel a bit nervous!

2. Make a list of the descriptions for each location and enter these into the program at lines 3505, 3520, 3540 and so on. Remember to put a RETURN statement after each description.

3. Make a list of secondary descriptions for each location and enter these into the program at lines 3510, 3530, 3550 and so on. Remember to put a RETURN statement after each description.

4. Make a list of the connections at each location, and then convert it into the entries for the Location Connection table — LOCAT$() — and enter them into data statements in the program at lines 10310-10380.

5. Decide what objects you're going to need in your adventure, make a list of them and their start locations, and place them into the program at lines 10510-10600.

6. Decide on the messages/responses you'll need and enter these into the program at lines 3005 onwards. Note that you'll have to put a RETURN statement at the end of each message/response.

7. Make up the dictionary of words you'll need and assign the codes to each word (remembering to give the same code to words of a similar meaning). When you've sorted these out, enter them into the program in the same format as you'll find at lines 10410-10480. Another thing to remember is that all the objects in the adventure must be placed here.

8. Decide what you're going to use the flags and counters for (see the section on Setting Up).

9. Make a list of the actions for the EVENT$ table. (If you test for the same combinations of words more than once, make sure you put the entries in the correct sequence!) Once you've sorted out all the actions, code them up and enter the relevant figures into the program at lines 10066-10088.

10. Make up the entries for the STATU$ table, code them and enter the relevant figures in the program at lines 10210-10296.

11. Test your adventure for errors — the best way to do this is to play the adventure as if you hadn't come across it before! You'll find that most of your errors will more than likely be in the EVENT$ and STATU$ tables, so check these first for any mistakes you might have made when you coded the data.

12. Find someone to inflict your adventure on!

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EXIT	Switches *Y64 MegaBasic* off.
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SSTRIP	Removes all unnecessary spaces from a Basic program.
Graphics Control	
INK	Sets the colour of the cursor.
BORDER	Sets the colour of the border.
PAPER	Sets the colour of the foreground.
CLS	Clears the screen.
CURSOR	Places the cursor anywhere on-screen.
HIRES	Selects a high resolution screen.
TEXT	Selects the text screen.
CLG	Clears the graphics screen.
BCOL	Sets the background colour in HIRES mode.
SET	Places a dot on the HIRES screen.
GCOL	Selects the colour of set points on the HIRES screen.
RESET	Resets any point on the HIRES screen.
SWITCH	Reverses a point on the HIRES screen.
DRAW	Draws lines on the HIRES screen.
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```
10440 NEXT N
10450 DATA 01NORT,01N,02SOUT,02S,03EAST,
03E,04WEST,04W,05UP,05U,06DOWN,06D
10460 DATA 13TAKE,13GET ,13GET,14DROP,14
LEAV,15LIGH,16OPEN,17LOOK,18TORC,19MATC
10470 DATA 19BOX,20KEYS,21COAL,22DYNA,23
WOOD,24SWIM,25STAT
10480 DATA 25INVE,27HELP,28QUIT,29DOOR,3
0READ
```

The Dictionary table (DICTN$) is held in the database between lines 10410-10480, and contains a list of the words recognised in the adventure. Each entry consists of six characters, comprising of a two character keycode and the first four letters of the word to be recognised; this allows you to specify more than one word for an action of the same meaning — for example, 'TAKE' and 'GET' both have code 13.

As you can see from the Dictionary table given for this micro-adventure, the first 12 words are reserved for directions — this helps speed up the response time of moving around; it's always easier to type 'N' than it is 'NORTH'.

THE DICTIONARY TABLE

01NORT(H)	**05**U	**16**OPEN	**24**SWIM
01N	**06**DOWN	**17**LOOK	**25**STAT(US)
02SOUT(H)	**06**D	**18**TORC(H)	**25**INVE(NTORY)
02S	**13**TAKE	**19**MATC(HES)	**27**HELP
03EAST	**13**GET	**19**BOX	**28**QUIT
03E	**13**GET—	**20**KEYS	**29**DOOR
04WEST	**14**DROP	**21**COAL	**30**READ
04W	**14**LEAV(E)	**22**DYNA(MITE)	
05UP	**15**LIGH(T)	**23**WOOD	

[redacted]

```
10510 FOR N=1 TO TNOBS
10520 READ DAT$
10530 LET OBJCT$(N)=DAT$
10540 READ OBDAT
10550 LET OBJ(N)=OBDAT
10560 LET INOBJ(N)=OBDAT
10570 NEXT N
10580 DATA "A TORCH",4,"A LIT TORCH",0,"
A BOX OF MATCHES",4,"A BUNCH OF KEYS",5
10590 DATA "A SACK OF COAL",5,"A BOX OF
DYNAMITE",5,"SOME DRY WOOD",6
10600 RETURN
```

The descriptions of the objects you'll find in this micro-adventure are listed in lines 10510-10600, together with their starting location; this data is held, respectively, in arrays OBJCT$() and OBJ(). Note that there's another array INOBJ() that contains a copy of the start location of each object.

Before we leave this table, make sure that when you're writing your own adventure you always place the name of each object you've hidden around the locations in the Dictionary table — otherwise, the player won't be able to pick them up!

THE OBJECT TABLE

Start location	Object description
4	The torch.
0	A lit torch.
4	A box of matches.
5	A bunch of keys.
5	A sack of coal.
5	A box of dynamite.
6	Some dry wood.

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THE COMPLETE Y64

MACHINE CODE TUTOR

Part 7 Interrupts

- The rotation commands.
- Interrupts.
- Random numbers.
- Writing your own programs.
- Homework solution.

Keeping in with last month's theme of bit manipulation — in which we took a look at the ASL and LSR commands that 'shift' the bits of any particular byte left or right respectively, putting the bit at the end of the shift into the clear flag — we'll be detailing two more useful commands. The commands in question are ROL (ROtate Left) and ROR (ROtate Right), and they take the form: ROL $QQQQ or ROL $QQ, and ROR $QQQQ or ROR $QQ.

Once executed, the target byte ($QQQQ) is shifted bit-by-bit in the direction of the rotation. The carry flag is placed in the first bit and then the last bit is placed into the carry flag.

Both rotation commands are simple enhancements of LSR and ASL and therefore their use is limited ... but do watch out for instances when they can be used instead of ASL or LSR.

HOMEWORK SOLUTION

```
  50 * = $C000 !START ADDRESS
  60 !
  70 !DEFINE LABELS
 100 CHROUT        =  $FFD2
 110 PLOT          =  $FFF0
 120 COUNT         =  $033E                    !UNUSED LOCATION
 130 !
 150               LDA #$93
 155               JSR CHROUT                  !CLEAR SCREEN
 160               LDA #$00                    !ZERO COUNT
 165               STA COUNT
 170 LOOP          JSR DOPLOT
 175               JSR DONAME
 180               INC COUNT
 185               LDA COUNT
 190               CMP #$06                    !ZERO TO FIVE IS SIX TIMES
 195               BNE LOOP
 200               RTS
 999 !PRINT A NAME
1000 DONAME        LDY #00
1005 DONAME1       LDA TEXT,Y
1010               CMP #$40                    !@
1015               BEQ DONAME2
1020               JSR CHROUT
1025               INY
1030               JMP DONAME1
1035 DONAME2       RTS
1999 !FIND NEXT PLOTTING POSITION
2000 DOPLOT        LDA COUNT
2005               ASL A                       !TIMES COUNT BY 2
2010               TAY
2015               LDA DATA,Y
2020               TAX
2025               INY
2030               LDA DATA,Y
2035               TAY
2040               CLC
2045               JSR PLOT
2050               RTS
2055 !
2999 !DATA FOR PLOT
3000 DATA          BYT $07,$06,$0A,$0A,$04,$08,$14,$12,$12,$20,$16,$16
3005 !TEXT FOR PRINT
3010 TEXT          TXT "ANDREW@"
```

Cast your minds back to the last issue and you'll remember that I asked you to write a small program in machine code that would print your name six times in different places all over the screen using the Kernal subroutines, PLOT and CHROUT. Obviously, the answer provided here will be different from your own... but that's because I've used a few new techniques. But just so you don't miss out, we'll go over the program given above in detail.

The program contains two subroutines, 'Doname' and 'Doplot', each of which is called in turn in a loop; the loop goes round six times for each of the six names. The location 'Count' is used to hold the number of times that the loop has gone round.

'Doplot' is called first and used to calculate the next position at which the name is printed. Meanwhile, 'Count' is multiplied by two and the correct data is fetched from the end of the program. (My assembler uses the BYT command for numerical data and TXT for alphanumeric (text, numbers and symbols) data; using these commands, you should be able to place data anywhere in your programs, but make sure that 64 doesn't try to execute this data or it'll probably crash). At the start 'Count' is set to zero and the first pair of numbers are fetched from the data line. The Kernal PLOT subroutine is then called and the cursor is placed at the specified column and row.

'Doname' takes the name store in the data at the end of the program and places it at the cursor position. I've used the '@' character to flag the end of the name. Needless to say, you could place your own name in the data at the end of the program, but make sure that you finish your name with an '@' so that the program places your name on the screen at the six positions. You should also notice that the program doesn't print the '@'; this is because the program branches out of the loop before the JSR CHROUT command.

Sorry To Interrupt!

Every 50th of a second, any program that's running on the 64 (be it in machine code or Basic) is interrupted and control is transferred to a special program at location $EA31. This program (known as the 'interrupt' program) takes care of all the internal workings of the 64, such as the clock, the cursor flash and keyboard.

Once the 'interrupt' program has done its job, all control is transferred back to whatever program was in progress; the interrupted program doesn't know there's been a break because the 'interrupt' program makes sure everything is exactly as it was before the interrupt. Once the main program has been interrupted it continues for another 50th of a second until it is then interrupted again; interrupts occur the whole time the 64 is turned on, even when there's no user-program actually running!

Well it's nice to know how the 64 operates ... but how does that help you make use of the interrupts. Luckily, when an interrupt occurs the 64 doesn't just jump to location $EA31, it looks at a special pointer (at location $0314 and $0315 in lo-hi format) and then jumps to the program at that pointer. We can make use of this pointer to direct flow to a program of our own; as this program is executed every 50th of a second, it could be used to play music, flash a portion of the screen or move the arms on an alien — anything you like really!

So far so good, but there's more! If we simply replace the 64's 'interrupt' program with our own, the 64 falls over after a very short while; this is because the 64's housework isn't being carried out. To solve this problem, though, is simple — just JMP to location $EA31 at the end of your own interrupt program and the 64 will take care of the rest!

Back To The Drawing Board

If you attempt the procedure above, it might work ... but don't hold your breath! Imagine the following. You place the lo byte of the start of your interrupt program (take this to be location $00 for a program at $C000) into location $0314. When the first 50th of a second comes up the 64 interrupts you trying to place the hi byte ($C0) into location $0315. The 64 then gives control to its interrupt program and so the 64 merrily crashes!

What we need is a method of either timing precisely the replacing of the pointer with our own, or a method of stopping the possibility of interrupts for a while. And before the debate starts, the second method is by far the easiest and there's a couple of machine code commands to achieve this anyway.

First up there's SEI (SEt disable Interrupt), which stops the interrupts and allows safe replacement of the pointer. Secondly you can make use of CLI (CLear disable Interrupt), which restores the interrupts after you've replaced the pointer with your own.

Just so you don't hurl the magazine across the room in frustration, there's an example of an interrupt program given here, that'll flash the top line of the screen. Type it all in and execute it (with SYS49152). You should find that the top line will

continue to flash, even after you've set up another program in machine code or Basic. Try adapting this short program for use in your own programs. By the way, a quick tap of the usual Run/Stop-Restore keys re-directs the pointer to location $EA31 and our interrupt program is stopped.

Overall interrupts are very useful and can take care of many of the more mundane background tasks in your programs... automatically! Have a look at the program given again and make sure you understand what's going on.

Random Hissing?

Some of you may have wondered how to conjour up random numbers in your machine code programs. I've heard it suggested that the trick is to somehow dip into Basic for a random number or even that there's a secret location where random numbers live!

Well, it is possible to use the locations that contain the 64's TI clock to produce a psuedo-random number, but you must remember that a clock is fairly constant. The numbers that you'd get from your clock would fall into a loop, and you *would* tend to get the same five or ten values occuring over and over again.

In actual fact, of the suggestions given above, the second one is along the right lines. The 64's hidden random number lies surprisingly in the SID (Sound Interface Device) chip. When you set the SID chip to produce 'white noise', it sends hundreds of random numbers to your TV's speaker, producing a sound not unlike heavy static. The idea here is to somehow tap into this source of random numbers. However, a problem arising from this is to find a way of stopping the speaker hissing while our programs are running.

The SID chip's designer has allowed us to tap into the random generator of Voice 3 (the SID chip has three voices) and also to silence Voice 3 while we do it. This lets us use the other two voices for sound effects, while Voice 3 is producing noises silently in the background.

There's an example program given here showing you how to set up the random number generator. All you have to do is JSR to this subroutine at the beginning of your program. To get a random number during your program, simply look at the value of location $D41B. If you label this location as 'RANDOM' or 'RANDOMNUMBER', then 'LDA RANDOM' will put a single byte (0-255) random number into the accumulator.

Of course, the higher you set the frequency of Voice 3, the quicker the SID chip will produce random numbers. Therefore, since you might well be accessing random numbers several times a second, set the frequency to its highest possible value by setting locations $D40E and $D40F to $FF. To turn off Voice 3, set bit 7 of the volume location ($D418) to one. During your program, to set the volume to its maximum value, you should now use '143' instead of the usual '15'.

Write On!

Writing your own small machine code programs is usually straight-forward. Just make sure that you take care of each mini-task, one at a time, until the overall task at hand is finished.

To look at a simple programming task, such as writing your name in the top-left of the screen, there are three clearly defined mini-tasks — clearing the screen, printing each letter in turn, and then returning to Basic. If, however, you're launching into the mammoth task of writing a full-sized game, you might well give up after you've considered all the planning and work involved. Those jet-setting whizz-kids don't get Porsches for nothing!

To write a game, you must first divide up the task into lots and lots of very small tasks; each of these will probably end up as a subroutine. For instance, to write a small *Space Invaders* clone you might first set up the following objectives: place all of the invaders on the screen; move all the invaders; move the player's turret; calculate the score; and work out the hi-score table.

Each of these tasks can be split up further until each job at hand is so detailed that the job of writing the program itself becomes a matter of designing dozens of small subroutines, each of which fit into the overall plan like a piece fitting into a jigsaw puzzle. This method is sometimes called 'Top-down design', but whatever it's called it makes a lot of small molehills out of a very big mountain — which can't be bad!

If you do set yourself a big task, such as a *Space Invaders* game, you might find that you don't know how to solve all of the problems. However, if you check all seven parts of this tutor or one of the many books on machine code, you'll soon find that you'll learn as you go along. Go on, set yourself a decent programming task and you'll find yourself better off for the experience. You never know, you might end up with the next *Pacman* or *Wordstar*!

INTERRUPTS

```
 100 * = $C000
 120 !
 130 SCREEN         =   $0400
 140 !
 150               JSR SETUP
 155               RTS
 160 !
 165 USERINT       LDY #$00
 170 LOOP          LDA SCREEN,Y
 180               EOR #%10000000
 190               STA SCREEN,Y                  !PUT IT BACK
 200               INY
 210               CPY #$28                      !40
 220               BNE LOOP
 230               JMP $EA31                     !GOTO NORMAL INTERRUPT
 240 !
1000 SETUP         SEI                           !SUSPEND INTERRUPTS
1010               LDA #<USERINT                 !REPLACE THE POINTER
1020               STA $0314                     !WITH OUR POINTER
1030               LDA #>USERINT
1040               STA $0315
1050               CLI                           !TURN INTERRUPTS BACK ON
1060               RTS                           !RETURN TO BASIC
```

This routine makes use of the interrupts on the 64, and it'll flash the top line of the screen ... even if you've got another program running alongside it! Press the Run/Stop-Restore keys to re-direct the pointer to location $EA31 and the interrupt routine will halt.

RANDOM NUMBERS

```
100 * = $C000
105 !
110 !LABELS
115 SID            =   $D400
120 RANDOM         =   $D41B
125 !
140               LDA #$FF                      !HIGH VALUE INCREASES
145               STA SID+$0E                   !FREQUENCY OF RANDOM
150               STA SID+$0F                   !NUMBER GENERATION
155               LDA #$80
160               STA SID+$12                   !NOISE
165               LDA #$80                      !TURN OFF VOICE 3
170               STA SID+$18                   !VOL
175               RTS
```

This example routine shows you how to set up a random number generator by tapping into the facilities of the SID chip. To get it working, JSR to this subroutine at the beginning of your own program, and then look at the value of location $D14B.

LOOKING BACK

Over the past seven tutorials, hopefully you've grown from a competent Basic programmer to one that's not frightened to augment your programs with a sprinkling of machine code here and there. And, to be honest, that means you're well on the way to becoming a good machine code programmer.

What you've got to do now is build on your experience while you've still got the confidence. Try and write a small program of your own design in machine code ... and if you have any difficulties, write to me — Andrew Bennett, c/o *Your 64*, 14 Rathbone Place, London W1P 1DE — and I'll try and give you some advice. Obviously, I can't answer all your queries, but I'll certainly try and provide the solutions to problems that will benefit everyone.

You may find that I've skirted around many of the more complex topics, but really you'll find that you learn more about the subject by tapping away at your keyboard and finding the solutions for yourselves in one of the many machine code books around on the market. Here at *Y64*, we look forward to seeing any programs you write in machine code (remember you could always become the *Y64* Programmer of the Year!) and, as I said earlier, if you do have a problem just drop me a line ...